NI 43-101
TECHNICAL REPORT

PRELIMINARY ECONOMIC ASSESSMENT
OF THE
IXTACA PROJECT

Puebla State, Mexico
618,800E and 2,176,100N
(NAD83 Zone 14)

Submitted to:
Almaden Minerals Ltd.

Effective Date: 22 January 2016
Updated: 7 April 2016

Qualified Persons	**Company**
Jesse Aarsen, P.Eng.	Moose Mountain Technical Services
Kristopher Raffle, P.Geo.	Apex Geoscience Ltd
G.H. Giroux, P.Eng.	Giroux Consultants Ltd
Tracey Meintjes, P.Eng.	Moose Mountain Technical Services
Ken Embree, P.Eng.	Knight Piésold Ltd

DATE & SIGNATURE PAGE

I, **Tracey Meintjes, P.Eng.**, of Vancouver B.C. certify that I have overseen the assembly of this Technical Report titled "***Preliminary Economic Assessment of the Ixtaca Project***" dated 22 January 2016, updated on 7 April 2016. I have relied on the expert opinions of the Qualified Persons listed in the report for areas outside of my relevant experience. This report fairly and accurately represents the information that has been made available to myself as of the date of the report and complies with the National Instrument 43-101 standards.

"ORIGINAL SIGNED AND SEALED"

Tracey Meintjes
P.Eng.

Dated the 7th day of April 2016.

CERTIFICATE & DATE PAGES

I, Jesse J. Aarsen, B.Sc. Mining Engineering, P.Eng., of Penticton B.C. do hereby certify that:

1. I am an Associate (Mining Engineer) with Moose Mountain Technical Services with a business address of 1975-1st Avenue South, Cranbrook BC, V1C 6Y3.
2. This certificate applies to the technical report entitled "Preliminary Economic Assessment of the Ixtaca Project" dated 22 January 2016, updated on 7 April 2016 (the "Technical Report")
3. I graduated with a Bachelor of Science degree in Mining Engineering Co-op from the University of Alberta in April 2002.
4. I am a member in good standing of the Association of Professional Engineers and Geoscientists of British Columbia (#38709) and the Association of Professional Engineers and Geoscientists of Alberta (#74969).
5. I have worked as a mining engineer for a total of 12 years since my graduation from university. I have also taken a 2 year period for personal travel throughout the world. My relevant experience for the purpose of the Technical Report includes:
    - 2002 to 2005 – employed at complex coal mine in the Elk Valley working as a short range, long range, dispatch, and pit engineer. Preparation of budget levels mine plans and cost inputs, oversaw operation of personal designs and acting in supervisory-role positions as needed.
    - Since 2007 – Consulting mining engineer specializing in mine planning and project development. Completion of mine plans for complex coal operating mines in north-eastern British Columbia and an open-pit copper/molybdenum mine in central British Columbia. Supervisory role in large multi-disciplinary studies for projects in both coal and hard-rock settings in Canada and Mongolia. Responsible for building several coal geology and block models and calculation of mineral resources under the supervision of a P.Geo.
6. I have read the definition of "qualified person" set out in National Instrument 43-101 ("the Instrument") and certify that by reason of my education, affiliation with a professional associations and past relevant work experience, I am a "Qualified Person" for the purposes of the Instrument.
7. I have visited the site on April 30-May 01, 2013, August 27-28, 2014 and March 15-16, 2016.
8. I have prepared and am responsible for the mining, components of Chapter 1; as well as Chapters 15, 16, 18, 25, and 26 of the Technical Report.
9. I am independent of Almaden Minerals applying the tests in Section 1.5 of the Instrument.
10. I have been involved with the Ixtaca Project during the preparation of the Preliminary Economic Assessment and the Technical Report that is based on the Preliminary Economic Assessment.
11. I have read the Instrument, and the Technical Report has been prepared in compliance with the Instrument.
12. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated the 7th day of April 2016

"ORIGINAL SIGNED AND SEALED"

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Signature of Qualified Person

Jesse J. Aarsen, B.Sc., P.Eng.

I, Kristopher J. Raffle, B.Sc., P.Geo., of Vancouver B.C. do hereby certify that:

1. I am a Principal (Geologist) of APEX Geoscience Ltd. with a business address 200-9797, 45 Avenue, Edmonton, Alberta, Canada T6E-5V8.
2. This certificate applies to the technical report entitled "Preliminary Economic Assessment of the Ixtaca Project" dated 22 January 2016, updated on 7 April 2016 (the "Technical Report").
3. I graduated with a Bachelor of Science degree in Geology (Honours) from the University of British Columbia in 2000.
4. I am a member of the Association of Professional Engineers and Geoscientists of British Columbia (#31400).
5. I have worked as an exploration geologist for a total of 14 years since my graduation from university. My relevant experience for the purpose of the Technical Report includes:
   - I have supervised numerous exploration programs specific to low sulphidation epithermal gold-silver deposits having similar geologic characteristics to the Tuligtic Property throughout British Columbia, Canada; and Jalisco, Nayarit and Puebla States, Mexico.
   - I have authored two previous Technical Reports with respect to the Tuligtic Property dated March 13, 2013 and February 12, 2014.
   - During 2013 and 2014, I supervised the compilation of surface geological, geochemical, and geophysical and data for the Tuligtic Property, and conducted a review and audit of Almaden's drill hole and QA/QC databases.
6. I have read the definition of "qualified person" set out in National Instrument 43-101 ("the Instrument") and certify that by reason of my education, affiliation with a professional associations and past relevant work experience, I am a "Qualified Person" for the purposes of the Instrument.
7. I have visited the site on three (3) separate occasions: October 17-20, 2011; September 23, 2012 and most recently on November 20, 2013.
8. I have prepared and am responsible for Chapters 2 through 12, 23, 24 and 27; including relevant portions of Chapters 1 and 26 of the Technical Report.
9. I am independent of Almaden Minerals applying the tests in Section 1.5 of the Instrument.
10. I have had no previous involvement with the Property that is the subject of the Technical Report than that which is stated in 5 and 7 above.
11. I have read the Instrument, and the Technical Report has been prepared in compliance with the Instrument.
12. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated the 7th day of April 2016

"ORIGINAL SIGNED AND SEALED"

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Signature of Qualified Person
Kristopher J. Raffle, B.Sc., P.Geo.

I, G.H. Giroux, P.Eng. MASc, of Vancouver B.C., do hereby certify that:

1. I, G.H. Giroux, of 982 Broadview Drive, North Vancouver, British Columbia, do hereby certify that:
2. I am a consulting geological engineer with an office at #1215 - 675 West Hastings Street, Vancouver, British Columbia.
3. I am a graduate of the University of British Columbia in 1970 with a B.A. Sc. and in 1984 with a M.A. Sc., both in Geological Engineering.
4. I am a member in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia.
5. I have practiced my profession continuously since 1970. I have had over 30 years' experience calculating mineral resources. I have previously completed resource estimations on a wide variety of precious metal deposits both in B.C. and around the world, many similar to the Ixtaca project.
6. 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, past relevant work experience and affiliation with a professional association (as defined in NI 43-101), I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
7. I am responsible for the preparation of Section 14 and relevant portions of Chapters 1 and 26 of the Technical Report titled "Preliminary Economic Assessment of the Ixtaca Project" dated 22 January 2016, updated on 7 April 2016 (the "Technical Report").
8. I have not visited the Property.
9. I have completed a previous resource estimate on the Property that is the subject of the Technical Report in 2013.
10. As of 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 portions of the Technical Report for which I am responsible not misleading.
11. I am independent of the issuer applying all of the tests in Section 1.5 of NI 43-101.
12. I have read NI 43-101, and the portions of the Technical Report for which I am responsible have been prepared in compliance with NI 43-101.

Dated the 7th day of April 2016

"ORIGINAL SIGNED AND SEALED"

____
Signature of Qualified Person
G. H. Giroux, P.Eng., MASc.

I, Tracey Meintjes, P.Eng., of Vancouver B.C. do hereby certify that:

1. I am a Metallurgical Engineer with Moose Mountain Technical Services with a business address at 1975 1st Avenue South, Cranbrook, BC, V1C 6Y3.
2. This certificate applies to the technical report entitled "Preliminary Economic Assessment of The Ixtaca Project" dated 22 January 2016, updated on 7 April 2016 (the "Technical Report").
3. I am a graduate of the Technikon Witwatersrand, (NHD Extraction Metallurgy – 1996)
4. I am a member in good standing of the Association of Professional Engineers and Geoscientists of British Columbia (#37018).
5. My relevant experience includes process engineering, operation, and supervision, and mine engineering in South Africa and North America. I have been working in my profession continuously since 1996.
6. I am a "Qualified Person" for the purposes of National Instrument 43-101 (the "Instrument").
7. I visited the Property from 01 July 2014 to 02 July 2014 and from 15 March 2016 to 16 March 2016.
8. I am responsible for Sections 13, 17, 19, 21 and 22; including metallurgical and processing portions of Chapters 1 and 26 of the Technical Report.
9. I am independent of Almaden Minerals as defined by Section 1.5 of the Instrument.
10. I have had no previous involvement with the Property that is the subject of the Technical Report.
11. I have read the Instrument and the Technical Report has been prepared in compliance with the Instrument.
12. As of the date of this certificate, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated the 7th day of April 2016

"ORIGINAL SIGNED AND SEALED"

____
Signature of Qualified Person
Tracey D. Meintjes, P.Eng.

I, Ken Embree, P.Eng., of Vancouver B.C. do hereby certify that:

1. This certificate applies to the technical report titled "Preliminary Economic Assessment of the Ixtaca Project", with an effective date 22 January 2016, updated on 7 April 2016 prepared for Almaden Minerals Ltd.;
2. I am currently employed as Managing Principal with Knight Piésold Ltd. with an office at 1400 – 750 West Pender St, Vancouver, BC Canada;
3. I am a graduate of the University of Saskatchewan with a Degree (B.A.Sc.) in Geological Engineering, 1986. I have practiced my profession continuously since 1986;
4. I am a Professional Engineer (17,439) with the Association of Professional Engineers and Geoscientists of British Columbia;
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 fulfill the requirements to be a "qualified person" for the purposes of NI 43-101. I am independent of the Issuer and related companies applying all of the tests in Section 1.5 of the National Instrument 43-101;
6. I visited the Ixtaca Project site on March 10 to 12, 2015 and March 15 to 16, 2016.
7. I am responsible for and/or shared responsibility for Section numbers 18.6 and 20; and including relevant portions of Chapters 1 and 26 of the Technical Report.
8. I have not had prior involvement with the Property that is the subject of the Preliminary Economic Assessment;
9. As of the date of this certificate, to the best of my knowledge, information and belief, this technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading;
10. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

Dated the 7th day of April 2016

"ORIGINAL SIGNED AND SEALED"

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Signature of Qualified Person
Ken Embree, P.Eng.

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1 SUMMARY

1.1 Introduction

This Preliminary Economic Assessment ("PEA") Technical Report is written for the Ixtaca Project (the "Project") as an update to the most recently issued PEA report (Amended PEA Report November 6, 2015), and has been prepared by Moose Mountain Technical Services ("MMTS") in conjunction with APEX Geoscience Ltd., Giroux Consultants Ltd, ("GCL") and Knight Piésold Ltd. ("KP"). The Ixtaca Project is 100% owned by Almaden Minerals Ltd. ("Almaden" or "the Company), subject to a 2% NSR owned by Almadex Minerals Ltd. ("Almadex"), and encompasses the Ixtaca Zone Deposit (Ixtaca Gold-Silver Deposit) that includes the Ixtaca Main, North, and Chemalaco Zones of the Tuligtic Property.

All currency amounts are referred to in U.S. dollars (USD) unless otherwise indicated.

Since the previous PEA, work has commenced towards completion of a pre-feasibility study ("PFS"), including metallurgical, geo-technical, hydrological and environmental fieldwork and studies along with a number of optimisation studies, and Almaden has secured an option to purchase the Rock Creek Mill (see Almaden news release of October 19th, 2015).

The primary reasons for providing an update to previous PEA studies on the Ixtaca Project are to show the impact of a significantly reduced initial capital cost on project economics and to demonstrate the viability of a new mine plan that focuses on the near surface high grade limestone hosted portions of the Ixtaca Zone deposit. The mine plan in this PEA Update is a smaller high grade plan that replaces the larger production scenario as described in previous PEAs, and incorporates results from various engineering studies related to the project which have been conducted since the September 2014 PEA report. The larger mine plan presented in previous PEAs has not been assessed using updated technical and economic assumptions, and previous PEAs are therefore no longer current and valid.

This PEA Update uses:

- The same resource model as the previous PEA;
- The Rock Creek Mill with average throughput of 7,500 tonnes per day;
- A smaller, near surface and payback focussed pit;
- Mine production schedule which targets higher grades earlier;
- Optimised waste placement and tailings management facilities;
- Base case metal prices of $US 1150/oz gold and $US 16/oz silver (72:1 silver-to-gold ratio).

PEA Update highlights:

- Initial Capital is $100.2 Million;
- 36 Million tonnes of mill feed averaging 0.76 g/t gold and 47 g/t silver (Average head grade of 1.42 g/t gold equivalent using a 72:1 silver to gold ratio)
- Total LOM production of 724,000 ounces of gold and 49 Million ounces of silver (1.6 Million gold equivalent ounces, or 116.5 Million silver-equivalent ounces at a 72:1 silver to gold ratio);
- Operating cost $684 per gold equivalent ounce, or $9.50 per silver equivalent ounces
- After-tax payback of initial capital in 2.6 years.
- Pre-tax NPV(5%) of $266 Million and internal rate of return of 39%;
- After-tax (including new Mexican Mining Duties) NPV(5%) of $165 Million and internal rate of return of 30%;

This PEA Update is preliminary in nature as it includes inferred mineral resources which are considered too speculative geologically to have the economic considerations applied that would enable them to be categorized as mineral reserves. There is no certainty that the PEA Update forecasts will be realized or that any of the resources will ever be upgraded to reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

1.2 Property Description and Location

The Tuligtic Property (the "Property" or the "Tuligtic Property") is held 100 percent (%) by Compania Minera Gorrión S.A. de C.V. (Minera Gorrión), a wholly owned subsidiary of Almaden Minerals Ltd. (together referred to as "Almaden"). The Tuligtic Property currently comprises two mineral claims totalling 14,229.55 hectares (ha) located within Puebla State, 80 kilometres (km) north of Puebla City, and 130km east of Mexico City. Almadex Minerals Limited holds a 2% Net Smelter Return Royalty (NSR) on the Property.

1.3 Accessibility, Climate, Local Resources, Infrastructure, Physiography

The Tuligtic Property is road accessible and is located within Puebla State, 80 kilometres (km) north of Puebla City, and 130km east of Mexico City. The Ixtaca Deposit within the Tuligtic Property is located 8km northwest of the town of San Francisco Ixtacamaxtitlán, the county seat of the municipality of Ixtacamaxtitlán, Puebla State.

The topography on the Tuligtic Property is generally moderate to steep hills with incised stream drainages. Elevation ranges from 2,300 metres (m) above sea level in the south to 2,800m in the north. Vegetation is dominantly cactus and pines and the general area is also somewhat cultivated with subsistence vegetables, bean and corn crops. The region has a temperate climate with average temperatures ranging from 19°C in June to 10°C in December. The area experiences approximately 600 to 700 mm of precipitation annually with the majority falling during the rainy season, between June and September.

Electricity is available on the Property as the national electricity grid services nearby towns such as Santa Maria and Zacatepec.

Almaden has negotiated voluntary surface land use agreements with landowners prior to entering the exploration area and commencing work. Additional or revised landowner agreements may be required in the event advanced operations are anticipated (for example potential tailings storage areas, potential rock storage areas, and potential processing plant sites). The Federal Mining Law in Mexico provides mineral claim owners the right to obtain the temporary occupancy or creation of land easements necessary to carry out exploration and mining operations.

1.4 History

Throughout the Property there is evidence that surficial clay deposits have once been mined prior to Almaden's acquisition of the project. Almaden acquired the Cerro Grande claims of the Tuligtic Property in 2001 following the identification of surficial clay deposits that have been interpreted to represent high-level epithermal alteration. Subsequent geologic mapping, rock, stream silt, soil sampling, and induced polarization (IP) geophysical surveys identified porphyry copper and epithermal gold targets within an approximately 5 x 5km area of intensely altered rock. In July 2010, Almaden initiated a diamond drilling program to test epithermal alteration within the Tuligtic Property, resulting in the discovery of the Ixtaca Zone. The first hole, TU-10-001 intersected 302.42 metres (m) of 1.01g/t Au and 48g/t Ag and multiple high grade intervals including 44.35m of 2.77g/t Au and 117.7g/t Ag.

1.5 Geological Setting and Mineralization

Within the Tuligtic Property, argillaceous limestone of the Late Jurassic to Early Cretaceous Upper Tamaulipas formation is underlain by transitional calcareous clastic rocks including siltstone, grainstone, mudstone, and shale. During the Laramide orogeny, the carbonate package has been intensely deformed into a series of thrust-related east verging anticlines. Calcareous shale units appear to occupy the cores of the anticlines while the thick bedded limestone/mudstone units occupy the cores of major synclines at the Ixtaca Zone. Limestone basement units are crosscut by intensely altered intermediate composition dykes. The deformed Mesozoic sedimentary sequence is discordantly overlain by epithermal altered Cenozoic bedded crystal tuff of the upper Coyoltepec subunit.

The epithermal vein system at the Main Ixtaca and Ixtaca North zones is associated with two sub parallel ENE (060 degrees) trending, sub-vertical to steeply north dipping dyke zones. A series of 2m to over 20m true width dykes occur within an approximately 100m wide zone. The Ixtaca North dyke zone is narrower and comprises a steeply north-dipping zone of two or three discrete dykes ranging from 5 to 20m in width. Epithermal vein mineralization occurs both within the dykes and sedimentary host rocks, with the highest grades often occurring within or marginal to the dykes. Vein density decreases outward to the north and south from the dyke zones resulting in the formation of two high-grade zones that lack sharp geologic boundaries. On surface, the Main Ixtaca and Ixtaca North zones are separated by a steep sided ENE trending valley.

The bulk of Main Ixtaca and Ixtaca North Zone mineralization is bound within an ENE-verging asymmetric synform. The synform is cored by a structurally thickened sequence of argillaceous limestone that grades laterally and at depth through transition units, into calcareous shale at depth. The Limestone sequence thins to the west along the rising limb of an ENE-verging antiform. The Main Ixtaca and Ixtaca North vein systems and the dykes transect the antiform sub-perpendicular to the strike of the fold axis. Vein density decreases within shale units coring the antiform, and mineralization is confined near the axis of the antiform within a west dipping tabular zone of low-grade mineralization having a true thickness ranging from 150 to 200m. Mineralized basement rocks are unconformably overlain by crystal tuff, which is also mineralized. High-grade zones of mineralization are present within the tuff vertically above the Main Ixtaca and Ixtaca North vein systems. The high-grade zones transition laterally into low grade mineralization, which together form a broad tabular zone of mineralization at the base of the tuff unit.

The Main and North zones have been defined over 650m and tested over 1000m strike length with high-grade mineralization intersected to depths up to 350m vertically from surface. The strike length of the Chemalaco Zone has been extended to 450m with high-grade mineralization intersected to a vertical depth of 550m, or approximately 700m down-dip. An additional sub-parallel zone has been defined underneath the Chemalaco Zone dipping 25 to 50 degrees to the WSW, intersected to a vertical depth of 250m, approximately 400m down-dip over a 250m strike length.

The Chemalaco Zone (also known as the Northeast Extension) has a strike length of approximately 450m as defined by drilling along a series of ENE (070 degrees) oriented sections spaced at intervals of 25 to 50m, and near-surface oblique NNW-SSE oriented drillholes. The Chemalaco Zone dips moderately-steeply at approximately 55 degrees to the WSW. Chemalaco Zone mineralization is interpreted to occur within the hinge zone of a shale cored antiform. Near surface along the axis of the antiform a narrow zone of structurally thinned, brecciated, and mineralized limestone is unconformably overlain by mineralized tuff rocks. At a vertical depth of approximately 50m below surface, high-grade shale-hosted mineralization dips moderately-steeply WSW sub-parallel to the interpreted axial plane of the antiform. The footwall of the high-grade zone is marked by a distinct 20 to 30m true-thickness felsic porphyry dyke (Chemalaco Dyke), which is also mineralized. The Chemalaco Dyke has been interested in multiple drillholes ranging from 250 to 550m vertically below surface, and its lower contact currently marks the base of Chemalaco Zone mineralization.

1.6 Exploration

Between 2001 and 2013, Almaden's exploration at the Tuligtic Property included geologic mapping and prospecting, alteration mineralogical characterization, rock and soil geochemical sampling, ground magnetics, IP and resistivity, Controlled Source Audio-frequency Magnetotelluric (CSAMT), and Controlled Source Induced Polarization (CSIP) geophysical surveys resulting in the identification of additional anomalous zones including the Ixtaca, Ixtaca East, Caleva, Azul, and Sol zones. Since 2010, a total of 475 diamond drillholes have been drilled at the Tuligtic Gold-Silver Project, totalling 154,566m.

1.7 Drilling

The 225 holes drilled between July, 2010 and November 13, 2012 totalled 81,971m and identified the Main Ixtaca, Ixtaca North and Chemalaco zones. Diamond drilling at 25 to 50m section spacing defined the Main Ixtaca and Ixtaca North as NE-oriented sub-vertical zones and a strike length of approximately 650m. High-grade mineralization was intersected to depths of 200 to 300m vertically from surface. The Chemalaco Zone was identified as dipping moderately-steeply over a strike length of 350m along a series of five ENE (070 degrees) oriented sections spaced at intervals of 50 to 100m. High grade mineralization having a true-width ranging from less than 30 and up to 60m was intersected beneath approximately 30m of tuff to a vertical depth of 550m, or approximately 600m down-dip.

During 2013 and subsequent to the November 13, 2012 cut-off of the maiden mineral Resource Estimate, Almaden drilled 198 holes totalling 55,467m. A total of 79 holes have been drilled at the Main Ixtaca Zone, 40 holes at the Ixtaca North Zone and 79 holes at the Chemalaco Zone. Drilling during 2013 focused on expanding the deposit and upgrading resources previously categorized as Inferred to higher confidence Measured and Indicated categories.

Drilling during 2014 and 2015, subsequent to the current Resource Estimate, Almaden has completed 52 additional drill holes totalling 17,128m (49 within the Ixtaca Deposit and 3 exploration drill holes outside the Ixtaca Deposit. Of the holes drilled within the Ixtaca Deposit during 2014 and 2015, 11 were metallurgical holes that twinned existing holes. The remainder were exploration holes testing mineralized zones at depth.

1.8 Sample Preparation, Analyses and Security

All strongly altered or epithermal-mineralized intervals of core have been sampled. Almaden employs a maximum sample length of 2 to 3m in unmineralized lithologies, and a maximum sample length of 1m in mineralized lithologies. During the years 2010 and 2011 Almaden employed a minimum sample length of 20cm. The minimum sample length was increased to 50cm from 2012 onwards to ensure the availability of sufficient material for replicate analysis. Drill core is half-sawn using industry standard diamond core saws. After cutting, half the core is placed in a new plastic sample bag and half are placed back in the core box. Sample numbers are written on the outside of the sample bags and a numbered tag placed inside the bag. Sample bags are sealed using a plastic cable tie. Sample numbers are checked against the numbers on the core box and the sample book.

ALS sends its own trucks to the Project to take custody of the samples at the Santa Maria core facility and transports them to its sample preparation facility in Guadalajara or Zacatecas, Mexico. Prepared sample pulps are then forwarded by ALS personnel to the ALS North Vancouver, British Columbia laboratory for analysis.

Drill core samples have been subject to gold determination via a 50 gram (g) AA finish FA fusion with a lower detection limit of 0.005ppm Au (5ppb) and upper limit of 10ppm Au (ALS method Au-AA24). Over limit gold values (>10ppm Au) are subject to gravimetric analysis (ALS method Au-GRA22). Silver, base metal and pathfinder elements for drill core samples are analyzed by 33-element ICP-AES, with a 4-acid digestion, a lower detection limit of 0.5ppm Ag and upper detection limit of 100ppm Ag (ALS method ME-ICP61). Over limit silver values (>100ppm Ag) are subject to 4-acid digestion ICP-AES analysis with an upper limit of 1,500ppm Ag (ALS method ME-OG62). Ultra-high grade silver values (>1,500ppm Ag) are subject to gravimetric analysis with an upper detection limit of 10,000ppm Ag (Ag-GRA22).

Drill core samples are subject to Almaden's internal QA/QC program that includes the insertion of analytical standard, blank and duplicate samples into the sample stream. A total of fifteen QA/QC samples are present in every 100 samples sent to the laboratory. QA/QC sample results are reviewed following receipt of each analytical batch. QA/QC samples falling outside established limits are flagged and subject to review and possibly re-analysis, along with the ten preceding and succeeding samples.

1.9 Data Verification

Mr. Kristopher J. Raffle, P.Geo., first visited the Tuligtic Property from October 17 to October 20, 2011. Additional visits to the Tuligtic Property have been carried out by Mr. Raffle on September 23, 2012 and November 20, 2013. During each of the property visits Mr. Raffle completed a traverse of the Ixtaca Zone, observed the progress of ongoing diamond drilling operations, and recorded the location of select drill collars. Almaden's complete drill core library has been made available and Mr. Raffle reviewed mineralized intercepts from a series of holes across the Ixtaca Zone. Mr. Raffle has collected quartered drill core samples as 'replicate' samples from select reported mineralized intercepts.

Based on the results of the traverses, drill core review, and 'replicate' sampling Mr. Raffle has no reason to doubt the reported exploration results. The analytical data is considered to be representative of the drill samples and suitable for inclusion in the Resource Estimate. In addition to the in-house Quality Assurance Quality Control (QAQC) measures employed by Almaden, Kris Raffle, P.Geo. of APEX Geoscience Ltd., completed an independent review of Almaden's drillhole and QAQC databases. The review included an audit of approximately 10% of drill core analyses used in the mineral resource estimate. A total of 10,885 database gold and silver analyses were verified against original analytical certificates. Similarly, 10% of the original drill collar coordinates and down hole orientation survey files were checked against those recorded in the database; and select drill sites were verified in the field by Kris Raffle, P.Geo. The QAQC audit included independent review of blank, field duplicate and certified standard analyses. All QAQC values falling outside the limits of expected variability were flagged and followed through to ensure completion of appropriate reanalyses. No discrepancies were noted within the drillhole database, and all QAQC failures were dealt with and handled with appropriate reanalyses.

1.10 Metallurgy

Exploratory metallurgical testwork was completed on each of the Ixtaca Zone geologic domains in 2012 and 2013 at Blue Coast Laboratories.

Additional metallurgical work has been carried out on new whole core composites, at McClelland Laboratories Inc. in Reno, Nevada. This test work has focused on optimizing gravity, rougher flotation and leach results over a broader range of head grades in the limestone unit. This test work continues to indicate overall process recoveries to average 90% for gold and silver for limestone hosted mineralisation.

Preliminary work to date on the minor volcanic and blackshale units indicates recoveries of 90% for silver and 50% for gold. Additional testwork is underway to optimise recoveries for these domains, both minor units in the PEA Update mine plan.

The ongoing work will focus on demonstrating the repeatability of the metallurgical performance particularly in the Limestone domain which represents 88% of mill feed in the PEA mine plan.

1.11 Resource Estimate

The previous maiden NI 43-101 compliant mineral Resource Estimate for the Ixtaca Deposit was derived from the drilling of 225 diamond drillholes between July, 2010 and November 13, 2012. The maiden resource for the Ixtaca deposit was announced on January 31, 2013 and consisted of an indicated mineral resource of 56.99 million-tonnes, comprising 2.02 million-ounces AuEq at an average grade of 1.10g/t AuEq; and an Inferred mineral resource of 41.53 million-tonnes, comprising 1.55 million-ounces AuEq at an average grade of 1.16g/t AuEq, each using a cut-off grade of 0.5g/t AuEq. Ixtaca Deposit resource was classified as Indicated and Inferred mineral resource according to the definitions from NI 43-101 and from CIM (2005). A cut-off of 0.50g/t AuEq was highlighted as a possible cut-off for open pit mining.

Based upon the results of the diamond drilling since November 13, 2012, an update to the maiden mineral resource for the Ixtaca deposit has been prepared by Giroux Consultants Ltd. (GCL). Preliminary metallurgy has shown roughly equivalent metal recoveries for Au and Ag, therefore the mineral Resource Estimate is presented at a series of AuEq cut-offs based on a three years trailing average price of $1,540 per-ounce Au, and $30 per-ounce Ag, and assuming one can mine to the limits of the mineralized solids and no edge dilution is included. The updated Ixtaca Deposit source has been classified as a Measured, Indicated, and Inferred Mineral Resource according to the definitions from NI 43-101 and from CIM (2014). A cut-off of 0.50g/t AuEq is highlighted as a possible cut-off for open pit mining. Table 1-1 below compares the 2013 maiden mineral Resource Estimate with the updated 2014 mineral Resource Estimate.

Table 1-1 Comparison of 2014 vs. 2013 Mineral Resource Estimation (with 0.5g/t AuEq Cut-off)

Year	Classification	Measured Resource				
		Tonnes	Grade AuEq[1] (g/t)	Au (g/t)	Ag (g/t)	Contained Metal x1000 AuEq[1] (ozs)
2014	Measured Resource	30,420,000	1.38	0.61	39.44	1,350
2013		-	-			-
2014	Indicated Resource	62,250,000	1.09	0.52	28.92	2,182
2013		56,780,000	1.10	0.52	29.94	2,014
2014	Inferred Resource	22,150,000	0.99	0.50	25.14	704
2013		41,120,000	1.16	0.56	31.44	1,539

1. *AuEq = Au + (Ag * 30/1540)*

Diamond drilling by Almaden has resulted in the identification of a Measured mineral resource of 30.42 million-tonnes, comprising 1.35 million-ounces AuEq at an average grade of 0.61 g/t Au, 39.44 g/t Ag and 1.38g/t AuEq; an Indicated mineral resource of 62.25 million-tonnes, comprising 2.18 million-ounces

AuEq at an average grade of 0.52 g/t Au, 28.92 g/t Ag and 1.09g/t AuEq; and an Inferred mineral resource of 22.15 million-tonnes, comprising 0.70 million-ounces AuEq at an average grade of 0.50 g/t Au, 25.14 g/t Ag and 0.99 g/t AuEq.

1.12 Proposed Development Plan

A PEA level mining design, production schedule, and cost model has been developed for the Ixtaca Zone of the Tuligtic Property. This current work focuses on the near surface high grade limestone hosted portions of the Ixtaca Zone deposit. This mine plan is a smaller high grade plan using updated technical and economic assumptions. In addition, this PEA Update incorporates Almaden's option to purchase the Rock Creek mill. The mine schedule includes an open pit mining operation with an average 7,500 tonne per day process plant to produce gold and silver doré. The process plant includes conventional crushing, grinding, gravity, flotation, and concentrate leaching. Direct mining will use a contractor owned and operated fleet.

A series of pit optimizations are run using the resource block model, applying a range of metal prices and recoveries, and estimated costs for mining, processing, and pit slopes. The operational pits are designed based on the optimized shell, and the potentially mineable portion of the resource is estimated within those pits. The ultimate pit contains a total of 214.3Ktonnes (kt) of combined mill feed and waste material including 35.5Ktonnes (kt) of mill feed, for a strip ratio of 5.0:1. The mill feed tonnages include a mining loss factor of 3%, and operational grade dilution of 3%. Pit resources by class is shown in the Table below assuming an NSR cutoff grade of $20/t:

Table 1-2 Recovered In-pit Resources and Diluted Grade

CLASS	Mill Feed kt	NSR ($/tonne)	Au (g/t)	Ag (g/t)
Measured	16.1	47.9	0.80	53.6
Indicated	18.3	39.9	0.73	43.6
Sub-Total of Measured and Indicated	34.4	43.7	0.76	48.3
Inferred	1.1	31.6	0.68	38.5

The potentially mineable tonnages in the PEA selected ultimate pit include Inferred Resources. The reader is cautioned that Inferred Resources are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that Inferred Resources will ever be upgraded to a higher category.

An average mill production rate of 7,500 tonnes per day is assumed. The Base Case production schedule includes one year of pre-production pre-stripping, followed by thirteen years of operating mine life. During the first nine years of production, mill feed is mostly direct feed from the mining operations. Low grade material encountered during the first nine years is directed to a low grade stockpile east of the mill. For the remaining mine life, material from the low grade stockpile is reclaimed and supplies the mill. At the end of the mine life there are approximately 13 million tonnes of stockpile material at an average grade of 0.31g/t Au and 45 g/t Ag that is treated as waste rock and is not processed. .

1.13 Production and Processing

The Base Case includes a 7,500 tonne per day process plant to produce gold and silver doré on site. The process plant includes conventional crushing, grinding, gravity, flotation, and concentrate leaching.

Almaden has secured an option to acquire the Rock Creek Mill. The Rock Creek mill located in Nome, Alaska was constructed, commissioned and operated for two months before mining operation were shut down due to the 2008 global financial crisis, environmental issues, and problems with mineral reserves.

Key features if the Rock Creek mill include:

- The flowsheet closely matches that of Ixtaca Project.
- It was built with good quality, mostly new equipment. The ball mill was bought second hand and refurbished before installation.
- The mill package includes all the processing facilities on site, only the building structures stay in place. Also included are the metallurgical and chemical and fire assay laboratories, and a number of spare parts for the ball mill and crushers.
- Majority of the engineering required for the Ixtaca process is complete, this will result in reduced construction time and cost savings for the Ixtaca project development.
- All the equipment is available with its associated electrical systems and controls, a number of them are installed in containers therefore relocation and reconnection will be straightforward.

1.14 Capital and Operating Costs

The Capital Cost Estimate for the Ixtaca Project is developed to a level appropriate for a PEA study in order to evaluate the overall project viability. As such, the level of accuracy is +/-35%. All Capital and Operating costs are reported in USD unless specified otherwise. The initial capital costs are summarized in Table 1-3 below:

Table 1-3 Projected Initial Capital Costs (USD million)

	Base Case
Site Infrastructure	$15.3
TMF and Water Management	$9.6
Mining	$25.1
Process Plant	$28.0
Indirects, EPCM, Contingencies and Owner's Costs	$22.2
Total Start-up Capital*	$100.2

** Numbers may not add due to rounding*

Life-of-Mine (LOM) sustaining capital includes raising the elevation of the Tailings Management Facility (TMF) through the mine schedule, Process Plant sustaining capital. Total LOM sustaining capital costs are estimated to be $24 million.

The total LOM operating costs for the Ixtaca Project are $26.99/tonne mill feed. This estimate includes the contractor mining, processing, G&A, GME, re-handle, reclamation and TMF and water management operating costs during the period of operations (initial capital costs are not included in the LOM operating costs). The LOM average breakdown of these costs is shown in Table 1-4 below:

Table 1-4 Projected Average LOM Operating Costs ($/tonne mill feed)

	Base Case
Mining Costs	$11.63
Processing	$13.73
Life of Mine TMF Management	$0.09
G&A	$1.54
Total*	**$26.99**

**Numbers may not add due to rounding*

1.15 Economic Analysis

The updated PEA project economics are based on gold price of $1150/oz and silver price of $16/oz. These prices are a combination of spot and current common peer usage. The project revenue is split between gold and silver with 52% coming from gold and 48% coming from silver. The after-tax economic analysis includes a corporate income tax rate of 30% (as per the Mexican Tax Reform increase effective Jan 01, 2014) as well as the two new mining duties:

a) 7.5% special mining duty and,
b) 0.5% extraordinary mining duty.

All in unit sustaining costs are summarized in the Table 1-5

Table 1-5 Summary All-in sustaining cost (exclusive of initial capital)

	Total $ million	$/ Oz AuEq
Cash operating Cost	959	684
Sustaining Capital Cost	24	17
Almadex Royalty	31	22
Mexican royalty taxes	47	34
Refining + Transport	54	39
Total	**1115**	**796**

A summary of financial outcomes comparing base case metal prices to two alternative metal price situations are presented below. The PEA base case prices are derived from a combination of spot prices and current common peer usage. The Alternate Case prices represent a discount to the lowest sustained metal prices over the previous three years. The 3 year trailing average prices represented the upside potential should metal prices regain their previous strength.

Table 1-6 Summary of Ixtaca Gold-Silver Economic Results and Sensitivities ($ Million)

	Alternate Case		Base Case		3 Year trailing Average	
	Pre-Tax	After-Tax	Pre-Tax	After-Tax	Pre-Tax	After-Tax
Gold Price ($/oz)	$1000		$1150		$1300	
Silver Price ($/oz)	$14		$16		$20	
Net Cash Flow	$235	$149	$435	$280	$731	$470
NPV (5% discount rate)	$132	$78	$266	$166	$464	$293
Internal Rate of Return (%)	24%	18%	39%	30%	57%	44%
Payback (years)	3.3	3.9	2.3	2.6	1.6	2.0

The economic results are based on the potentially mineable tonnages in the selected ultimate pit. Approximately 3% of the potentially mineable tonnages in the PEA selected ultimate pit are Inferred Resources. The reader is cautioned that Inferred Resources are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that Inferred Resources will ever be upgraded to a higher category. The reader is further cautioned that the preliminary economic assessment is preliminary in nature, and that there is no certainty that the preliminary economic assessment will be realized.

The Project pre-tax NPV at 5% discount rate sensitivity shown in the Figure below:

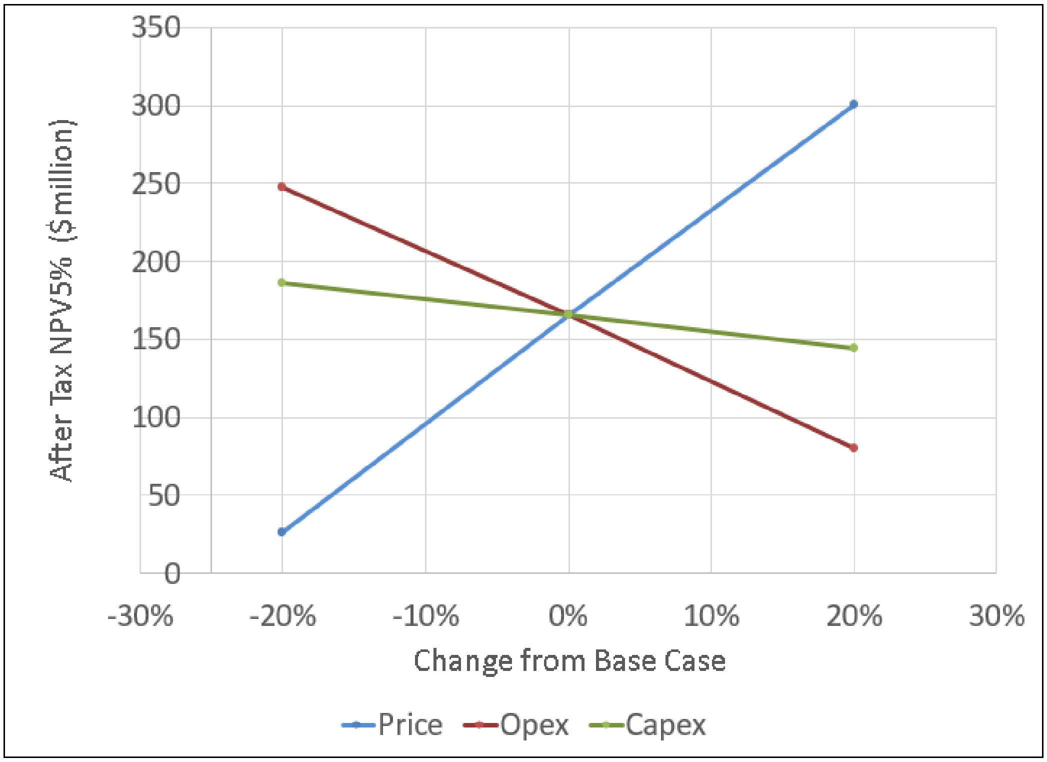


Figure 1-1 After-Tax NPV (5%) Sensitivities

The sensitivity analysis demonstrates

- Project NPV is more sensitive to metal price than operating cost (Opex) or capital costs (Capex).
- The Ixtaca Project has robust economics.

1.16 Environmental and Social Considerations

Environmental and Community/Social programs are in progress and will continue as the Project progresses into advanced studies. Currently there are no known issues that can materially impact the ability to extract the mineral resources at the Ixtaca Project. Previous and ongoing environmental studies include meteorology, water quantity and quality, and flora and fauna. KP has been retained by Almaden to help with long lead item studies concerning environmental monitoring, assessment and permitting matters. Almaden established the following environmental objectives for the Project:

- Protect surface and ground water quality;
- Incorporate environmental enhancement opportunities into the mine and final reclamation plans;
- Minimize the project footprint.

In order to achieve these objectives Almaden and KP have instituted the following management strategies:

Water Management – Almaden, with KP, has developed a comprehensive water monitoring strategy including the commencement of a hydrometric and climate monitoring program, and the drilling of water measurement wells. The latest assessment of site specific and regional weather patterns was used to develop an annual water balance, which suggests that management of rainfall and runoff from within the project area will provide sufficient water to meet the mill requirements. An annual water surplus is predicted for average precipitation conditions and this can be managed through the use of diversion ditches around the TMF. Additional measures can be incorporated to manage the pond volume in the TMF if required. These measures may include enhanced evaporation (spray evaporators) or water treatment, with release of treated water to the environment. Clean water pumped from pit dewatering wells could also be diverted downstream of the pit, into the natural drainage as needed. The water balance will be carefully monitored during operations to confirm if any additional water management measures are required. A detailed monthly life-of-mine water balance will be prepared for future studies. The detailed monthly water balance will incorporate updated site specific hydrometeorological data address and will address extreme wet and dry conditions.

Currently local communities use existing water supplies that come from natural springs located at higher elevations and upstream of the Ixtaca deposit. Stream flow upstream of the project will be collected in a storage facility and diverted around the mine area. The storage facility creates a more reliable fresh water supply source for local use.

Management of Rock – The limestone host rock, which constitutes a large portion of the total waste rock, has buffering capacity. Geochemical characterization of site materials has confirmed that the waste rock is not expected to be net acid generating.

Environmental Monitoring – Groundwater monitoring to ensure compliance with all applicable best management practice (BMP) technologies is a fundamental component of the Project. Flora and fauna studies have been completed.

Community – The Ixtaca project is located in an area previously logged and with little to no current land use. The mine will not require the resettlement of any communities. It is currently anticipated that water wells will not be required, as preliminary models indicate that there is sufficient water for operations from collection of rainwater. As the local community draws its water from springs at higher elevations than the mine plan, community water is unlikely to be impacted by mine development.

The Company has employed up to 70 local people in its drilling program who live local to the Ixtaca deposit. Local employees have made up virtually all the drilling staff, and have been trained on the job. The Company has implemented a comprehensive science based and objective community relations and education program for employees and all local stakeholders to transparently explain the exploration program underway as well as the potential impacts and benefits of any possible future mining operation at Ixtaca. The Company regards the local communities to be major stakeholders in the Ixtaca deposit's future along with the Company's shareholders. Every effort is being made to create an open and clear dialogue with our stakeholders to ensure that any possible development scenarios that could evolve from the anticipated future studies are properly understood and communicated throughout the course of the Company's exploration and development program. The Company invites all interested parties to visit www.almadenminerals.com to find out more about our community development, education and outreach programs.

In due course, the permitting requirements of the Project will be fulfilled, which is a known and regulated process in Mexico.

1.17 Conclusions and Recommendations

The Ixtaca deposit is well suited for a potential mining operation. A PEA mine plan with an average mill feed of 7,500tpd for 13 years has been developed with average LOM mill feed grades of 0.76g/t gold and 47.5g/t silver. Higher grade mineralized material is mined and processed early in the mine schedule enabling quick initial capital payback.

The Project exhibits strong economics at a range of metal prices.

A detailed budget and plan for a PFS has been recommended with the additional work plans included for geotechnical, geomechanical, metallurgical testing, mine planning optimization, environmental characterization, and baseline studies.

2 INTRODUCTION

This PEA is written for the Ixtaca Gold-Silver Deposit (or "Ixtaca Project") of the Tuligtic Property, which is held 100 percent (%) by Compania Minera Gorrión S.A. de C.V. (Minera Gorrión), a wholly owned subsidiary of Almaden Minerals Ltd. (together referred to as "Almaden"), subject to a 2% NSR in favour of Almadex Minerals Limited. The Tuligtic Property currently comprises two mineral claims totalling 14,229.55 hectares (ha) within Puebla State, Mexico (Figure 4-1 and Figure 4-2). The purpose of this Technical Report is to present the results of the Preliminary Economic Assessment (PEA) of the Ixtaca Project. This Technical Report (PEA) supersedes two previous 2014 Technical Reports dated 13 May 2014 and 09 October 2014 (amended 06 November 2015).

During 2013, Almaden retained Moose Mountain Technical Services ("MMTS") to complete a mining study on the Ixtaca Project for the purpose of producing a PEA. The lead author, Tracey Meintjes, P.Eng., principal of MMTS, an independent qualified person as defined by NI 43-101, conducted a property visit on July 02-04. Another author, Mr. Kristopher J. Raffle, P.Geo., Principal of APEX, an independent qualified person as defined by NI 43-101, conducted a property visit on November 20, 2013 and on previous occasions on September 23, 2012 and between October 17 and 20, 2011.

This report is written to comply with standards set out in National Instrument (NI) 43-101 for the Canadian Securities Administration (CSA), and is a technical summary of available geologic, geophysical, geochemical and diamond drillhole information. The authors, in writing this report use sources of information as listed in the references section. Government reports have been prepared by qualified persons holding post-secondary geology, or related university degree(s), and are therefore deemed to be accurate. These reports, which are used as background information, are referenced in this Report in the "Geological Setting and Mineralization" Section 7 below. All currency amounts are referred to in USD where indicated. All units in this Report are metric and Universal Transverse Mercator (UTM). Coordinates in this report and accompanying illustrations are referenced to North American Datum (NAD) 1983, Zone 14.

Several authors contributed to or supervised the completion of this Technical Report, and are all independent Qualified Persons ("QP") within the meaning of Canadian Securities Administrator's National Instrument 43-101 Standards. Each QP in this report takes responsibility for their work as outlined in their QP Certificates included in this report and found in the following chart:

Qualified Person	Company	Sections of Responsibility
Jesse Aarsen	Moose Mountain Technical Services	1,15-16, 18
Tracey Meintjes	Moose Mountain Technical Services	1, 13, 17, 19, 21-22, 25-26
Gary Giroux	Giroux Consultants Ltd	1, 14, 26
Kris Raffle	APEX Geoscience	1,2-12, 23-24, 27, 26
Ken Embree	Knight Piésold Ltd.	1, 20, 26

3 RELIANCE ON OTHER EXPERTS

With respect to legal title to the Cerro Grande and Cerro Grande 2 mineral claims, which currently comprise the Tuligtic Property, the authors have relied on the opinion of Lic. Mauricio Heiras Garibay. In a report provided to the authors on August 20, 2012, Mr. Heiras warrants that Minera Gorrión maintains 100% ownership of the two mineral claims comprising the Tuligtic Property via a December 13, 2011 Assignment of Rights Agreement completed with Minera Gavilán, S.A. de C.V., also a wholly owned subsidiary of Almaden. The claims are shown as being in good standing and held 100% by Minera Gavilán, S.A. de C.V on the Mexico Integrated System of Mining Administration (SIAM) website (http://www.economia-dgm.gob.mx/cartografia/). Almaden has recently filed an application to reduce the aggregate claim size at Tuligtic.

4 PROPERTY DESCRIPTION AND LOCATION

The Tuligtic Property currently consists of two mineral claims totaling 14,229.55ha (Table 4-1, and Figure 4-2). Almaden acquired the claims during 2001 as part of a regional exploration program. Minera Gorrión maintains 100% ownership of the two mineral claims comprising the Tuligtic Property via a December 13, 2011 Assignment of Rights Agreement completed with Minera Gavilán S.A. de C.V. also a wholly owned subsidiary of Almaden, subject to a 2% NSR in favour of Almadex Minerals Limited. Almaden has recently filed an application to reduce the aggregate claim size at Tuligtic.

Table 4-1 Tuligtic Property Mineral Claims

Claim Name	Claim Number	Valid Until Date	Area (hectares)
Cerro Grande	219469	March 5, 2059	11,201.55
Cerro Grande 2	233434	February 23, 2059	3,028.00
		Total	**14,229.55**

The Property is located at: 19 degrees 40 minutes north latitude and 97 degrees 51 minutes west longitude; or UTM NAD83 Zone 14 coordinates: 618,800m east and 2,176,100m north. The Tuligtic Property is road accessible and is located within Puebla State, 80 kilometres (km) north of Puebla City, and 130km east of Mexico City.

Following an amendment to the Mining Law of Mexico (the “Mining Law”) on April 28, 2005, there is no longer a distinction between the exploration mining concessions and exploitation mining concessions. The Mining Law permits the owner of a mining concession to conduct exploration for the purpose of identifying mineral deposits and quantifying and evaluating economically usable reserves, to prepare and to develop exploitation works in areas containing mineral deposits, and to extract mineral products from such deposits. Mining concessions have duration of 50 years from the date of their recording in the Registry and may be extended for an equal term if the holder requests an extension within five years prior to the expiration date.

To maintain a claim in good standing holders are required to provide evidence of the exploration and/or exploitation work carried out on the claim under the terms and conditions stipulated in the Mining Law, and to pay mining duties established under the Mexican Federal Law of Rights, Article 263. Exploration work can be evidenced with investments made on the lot covered by the mining claim, and the exploitation work can be evidenced the same way, or by obtaining economically utilizable minerals. The Regulation of the Mining Law indicates the minimum exploration expenditures or the value of the mineral products to be obtained (Table 4-2).

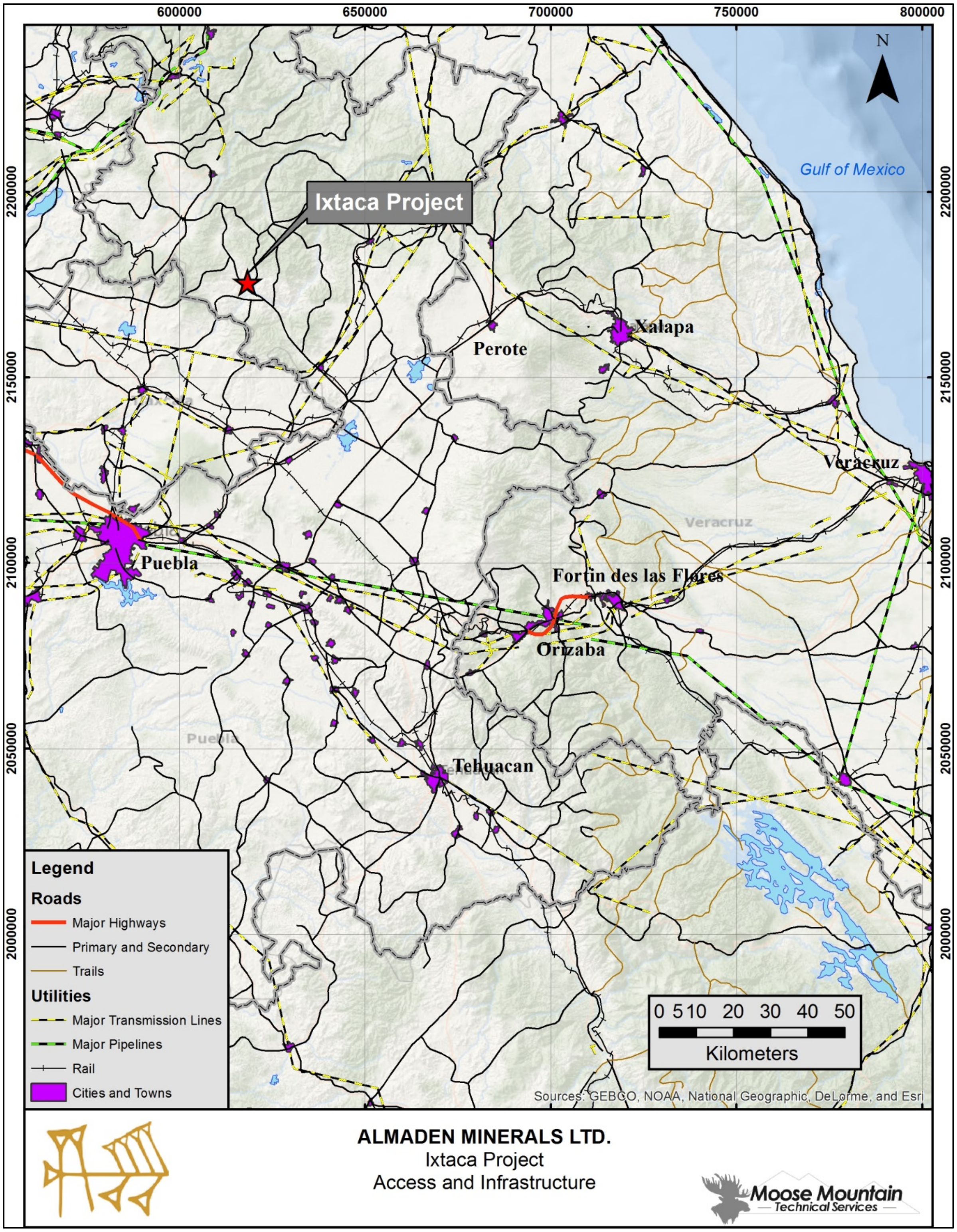


Figure 4-1 General Location

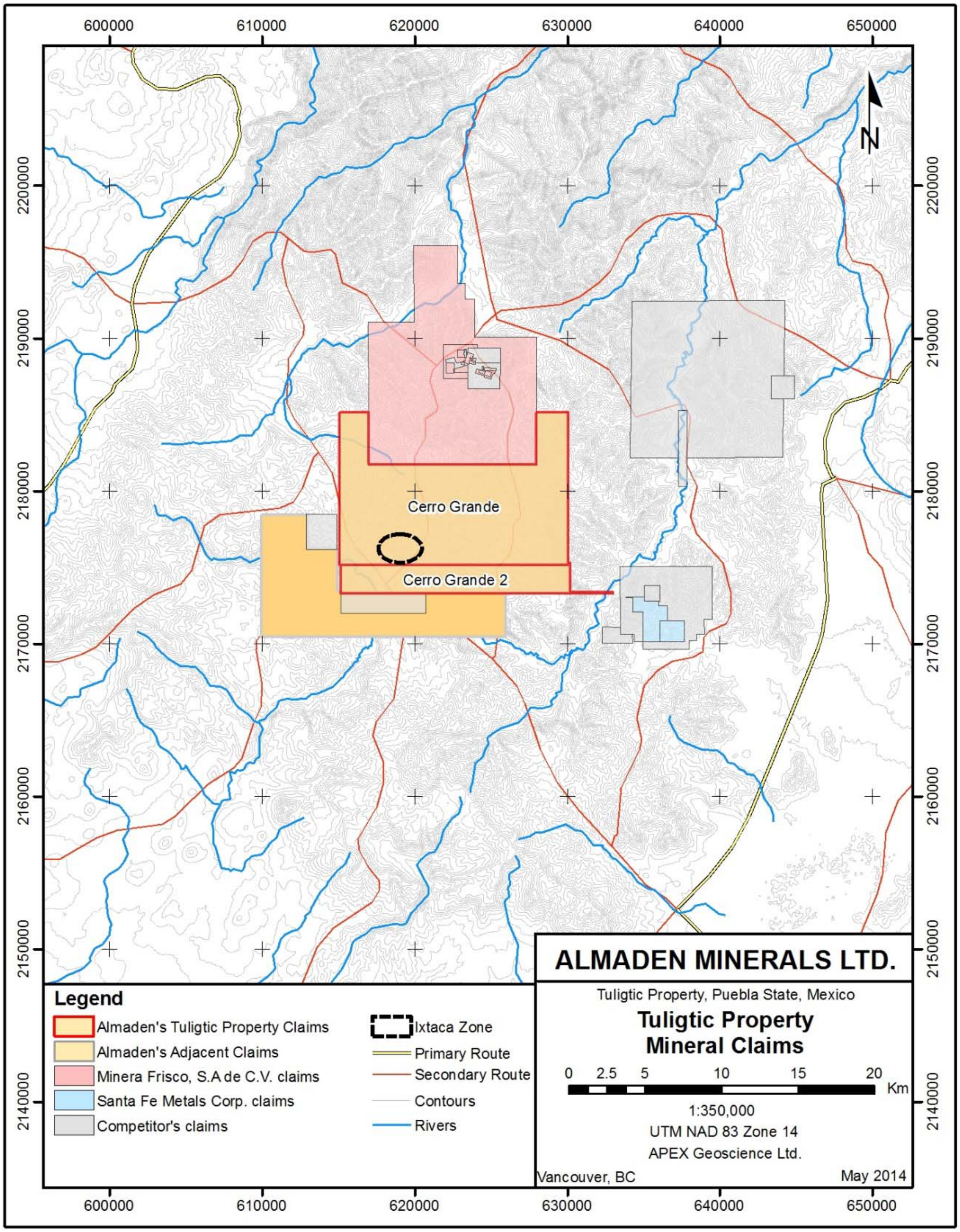


Figure 4-2 Tuligtic Property Mineral Claims

Table 4-2 Exploitation Claim Minimum Expenditure/Production Value Requirements

Area (hectares)	Fixed quota in Pesos	Additional annual quota per hectare in Pesos (USD per hectare)			
	(USD)	Year 1	Year 2-4	Year 5-6	Year 7+
<30	262.24 (20.98)	10.48 (0.84)	41.95 (3.36)	62.93 (5.03)	63.93 (5.11)
30 - 100	524.49 (41.96)	20.97 (1.68)	83.91 (6.71)	125.88 (10.07)	125.88 (10.07)
100 - 500	1,048.99 (83.92)	41.95 (3.36)	125.88 (10.07)	251.75 (20.14)	251.75 (20.14)
500 - 1000	3,146.98 (251.76)	38.81 (3.10)	119.91 (9.59)	251.75 (20.14)	503.51 (40.28)
1000 - 5000	6,293.97 (503.52)	35.66 (2.85)	115.39 (9.23)	251.75 (20.14)	1,007.03 (80.56)
5000 - 50000	22,028.92 (1,762.31)	32.52 (2.60)	111.19 (8.90)	251.75 (20.14)	2,014.07 (161.13)
> 50000	209,799.28 (16,783.94)	29.37 (2.35)	104.9 (8.39)	251.75 (20.14)	2,014.07 (161.13)

**Using a conversion of 1 MEX peso = 0.08USD*

The Tuligtic Property is currently subject to annual exploration/exploitation expenditure requirements of approximately $130,000.00 per year.

Subject to the Mexico Mining Laws, any company conducting exploration, exploitation and refining of minerals and substances requires previous authorization from the Secretary of Environment and Natural Resources (SEMARNAT). Because mining exploration activities are regulated under Official Mexican Norms (specifically NOM-120) submission of an Environmental Impact Statement ("Manifestacion de Impacto Ambiental" or "MIA") is not required provided exploration activities to not exceed disturbance thresholds established by NOM-120. Exploration activities require submission to SEMARNAT of a significantly less involved "Preventive Report" (Informe Preventivo) which outlines the methods by which the owner will maintain compliance with applicable regulations. If the exploration activities detailed within the Preventive Report exceed the disturbance thresholds established by NOM-120, SEMARNAT will inform the owner that an MIA is required within a period of no more than 30 days.

The present scale of exploration activities within the Tuligtic Property are subject to NOM-120 regulation. In future, if significantly increased levels of exploration activities are anticipated submission of an Environmental Impact Statement may be required. Almaden has negotiated voluntary surface land use agreements with surface landowners within the exploration area prior to beginning activities.

At present, the authors are not aware of any environmental liabilities to which the Property may be subject, or any other significant risk factors that may affect access, title, or Almaden's right or ability to perform work on the Property.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

The Ixtaca deposit, the epithermal gold-silver target within the Tuligtic Property, is located 8km northwest of the town of San Francisco Ixtacamaxtitlán, the county seat of the municipality of Ixtacamaxtitlán, Puebla State.

The Project is accessible by driving 40km east along Highway 119 from Apizaco; an industrial centre located approximately 50km north of Puebla City, and then north approximately 20km along a gravel road to the town of Santa Maria. The trip from Apizaco to site can be driven in approximately 1.5 hours. There is also access to the Property using gravel roads from the northeast via Tezhuitan and Cuyoaco, from the south via Libres and from the northwest via Chignahuapan. The Xicohtencatl Industrial complex lies 30km southwest by paved road from the Tuligtic Property, and houses agricultural, chemical, biomedical and industrial manufacturing facilities and is serviced by rail. Puebla, the fourth largest city in Mexico has a population in excess of 4 million people, and includes one of the largest Volkswagen automotive plants outside Germany.

The topography on the Tuligtic Property is generally moderate to steep hills with incised stream drainages. Elevation ranges from 2,300 metres (m) above sea level in the south to 2,800m in the north. Vegetation is dominantly cactus and pines and the general area is also somewhat cultivated with subsistence vegetables, bean and corn crops. The region has a temperate climate with average temperatures ranging from 19°C in June to 10°C in December. The area experiences approximately 600 to 700 mm of precipitation annually with the majority falling during the rainy season, between June and September.

Exploration can be conducted year round within the Property; however, road building and drilling operations may be impacted by weather to some degree during the rainy season.

Electricity is available on the Property as the national electricity grid services nearby towns such as Santa Maria and Zacatepec.

Almaden has negotiated voluntary surface land use agreements with landowners prior to entering the exploration area and commencing work. Additional or revised landowner agreements may be required in the event advanced operations are anticipated (for example potential tailings storage areas, potential rock storage areas, and potential processing plant sites). The Federal Mining Law in Mexico provides mineral claim owners the right to obtain the temporary occupancy or creation of land easements necessary to carry out exploration and mining operations.

6 HISTORY

Throughout the Property there is evidence that surficial clay deposits have once been mined. This clay alteration attracted Almaden to the area and has been interpreted to represent high-level epithermal alteration. To the best of the authors' knowledge no modern exploration has been conducted on the Project prior to Almaden's acquisition of claims during 2003 and there is no record of previous mining; as such, this is a maiden discovery.

On May 9, 2002, Almaden entered into a joint venture agreement with BHP Billiton World Exploration Inc. (BHP) to undertake exploration in eastern Mexico. Initial helicopter-borne reconnaissance programs were completed in May 2003 and March 2004 on select targets within the joint venture area of interest. The work resulted in the acquisition of five (5) separate properties, in addition to the previously acquired Cerro Grande claim of the present day Tuligtic Property. Following a review of the initial exploration data, effective January 20, 2005, BHP relinquished its interest in the six properties to Almaden (Almaden, 2005). The joint venture has been terminated in 2006 (Almaden, 2006).

During January 2003, Almaden completed a program of geologic mapping, rock, stream silt sampling and induced polarization (IP) geophysical surveys at the Tuligtic Property (then known as the "Santa Maria Prospect"). The exploration identified both a porphyry copper and an epithermal gold target within an approximately 5 x 5km area of intensely altered rock. At the porphyry copper target, stockwork quartz-pyrite veins associated with minor copper mineralization overprint earlier potassic alteration within a multi-phase intrusive body. A single north-south oriented IP survey line identified a greater than 2km long elevated chargeability response coincident with the exposed altered and mineralized intrusive system. Volcanic rocks exposed 1km to the south of the mineralized intrusive display replacement silicification and sinter indicative of the upper parts of an epithermal system (the "Ixtaca Zone"). Quartz-calcite veins returning anomalous values in gold and silver and textural evidence of boiling have been identified within limestone roughly 100m below the sinter. The sinter and overlying volcanic rocks are anomalous in mercury, arsenic, and antimony (Almaden, 2004).

Additional IP surveys and soil sampling were conducted in January and February 2005, further defining the porphyry copper target as an area of high chargeability and elevated copper, molybdenum, silver and gold in soil. A total of eight (8) east-west oriented lines, 3km in length, spaced at intervals of 200m have been completed over mineralized intrusive rocks intermittently exposed within gullies cutting through the overlying unmineralized ash deposits (Almaden, 2006).

The Tuligtic Property has been optioned to Pinnacle Mines Ltd. in 2006 and the option agreement has been terminated in 2007 without completing significant exploration (Almaden, 2007).

The Property has been subsequently optioned to Antofagasta Minerals S.A. (Antofagasta) on March 23, 2009. During 2009 and 2010 Antofagasta, under Almaden operation, carried out IP geophysical surveys and a diamond drill program targeting the copper porphyry prospect (Figure 7-2, Figure 9-1). Three additional IP survey lines have been completed, and in conjunction with the previous nine (9) IP lines, a 2 x 2.5km chargeability high anomaly, open to the west and south, has been defined (Almaden, 2011). The 2009 drilling consisted of 2,973m within seven (7) holes that largely intersected skarn type mineralization.

Highlights of the drill program include:

- 38m of 0.13% Copper (Cu) from 164 to 202m and 0.11% Cu from 416 to 462m within hole DDH-01;
- 20m of 0.17% Cu from 94 to 114m and 26m of 0.14% Cu from 316 to 342m in hole DDH-02;
- 58m of 0.17% Cu from 366 to 424m in hole DDH-03 (including 14m of 0.27% Cu from 410 to 424m);
- 2m of 0.63% Cu from 18 to 20m in hole DDH-04; and
- 20m of 0.11% Cu from 276 to 296m and 8m of 0.13% Cu in hole DDH-05.

Molybdenum values are anomalous ranging up to 801 parts-per-million (ppm) (0.08%). Elevated gold values are also encountered including 2m of 1.34 grams-per-tonne (g/t) from 178 to 180m in DDH-01.

On February 16, 2010, Almaden announced that Antofagasta has terminated its option to earn an interest in the Property (Almaden, 2009).

In July 2010, Almaden initiated a preliminary diamond drilling program to test epithermal alteration within the Tuligtic Property, resulting in the discovery of the Ixtaca Zone. The target is based on exploration data gathered by Almaden since 2001 including high gold and silver in soil and a chargeability and resistivity high anomaly (derived from an IP geophysical survey conducted by Almaden) topographically beneath Cerro Caolin, a prominent clay and silica altered hill. This alteration, barren in gold and silver, has been interpreted by Almaden to represent the top of an epithermal system which required drill testing to depth. The first hole, TU-10-001 intersected 302.42 metres of 1.01g/t gold and 48g/t silver and multiple high grade intervals including 44.35 metres of 2.77g/t gold and 117.7g/t silver.

7 GEOLOGICAL SETTING AND MINERALIZATION

7.1 Regional Geology

The Ixtaca Project is situated within the Trans Mexican Volcanic Belt (TMVB), a Tertiary to recent intrusive volcanic arc extending approximately east-west across Mexico from coast to coast and ranging in width from 10 to 300km (Figure 7-1). The TMVB is the most recent episode of a long lasting magmatic activity which, since the Jurassic, produced a series of partially overlapping arcs as a result of the eastward subduction of the Farallon plate beneath western Mexico (Ferrari, 2011). The basement rocks of the eastern half of the TMVB are Precambrian terranes, including biotite orthogneiss and granulite affected by granitic intrusions, grouped into the Oaxaquia microcontinent (Ferrari et al., 2011; Fuentes-Peralta and Calderon, 2008). These are overlain by the Paleozoic Mixteco terrane, consisting of a metamorphic sequence known as the Acatlan complex and a fan delta sedimentary sequence known as the Matzitzi formation. Another sedimentary complex is found on top of the Mixteco terrane, represented by various paleogeographic elements such as the Mesozoic basins of Tlaxiaco, Zongolica, Zapotitlan, and Tampico-Misantla (Fuentes-Peralta and Calderon, 2008). The subducting plates associated with the TMVB are relatively young, with the Rivera plate dated at 10Ma (million years) and the Cocos plate at 11 to 17Ma.

The timing and nature of volcanism in the TMVB has been described by Garcia-Palomo et al. (2002). The oldest volcanic rocks in the central-eastern part of the TMVB were erupted ~13.5Ma ago, followed by a nearly 10Ma hiatus. Volcanic activity in the area resumed around 3.0-1.5Ma. The composition of volcanic rocks ranges from basalt to rhyolite and exhibits calc-alkaline affinity. Extensive silicic volcanism in this area has been related to partial melting of the lower crust, hydrated by infiltration of slab-derived fluids during flat subduction (Ferrari et al., 2011). The Sierra Madre Occidental (SMO) style of volcanism is silicic and explosive as opposed to intermediate and effusive volcanism characteristic of the TMVB. Volcanic centres in the region have been controlled by NE-SW trending normal faults, associated with horst-and-graben structures, resulting from a stress field with a least principal stress ($\sigma 3$) oriented to the NW.

The regional trend of the arc rocks is WNW; though more northerly trending transforms faults, forming at a high angle to the TMVB, provide a structural control on the volcanic units (Coller, 2011). Compressional strike-slip and extensional faults also developed as a result of compressional and extensional periods during subduction. The NE-SW San Antonio fault system, which is still active during Late Pliocene, before the reactivation of the Taxco-Queretaro fault system, is characterized by extensional left-lateral oblique- slip kinematics (Coller, 2011). Bellotti et al. (2006) show that NNW trending regional faults have been right lateral in the Miocene, whereas the NNE to N-S trending faults observed at Ixtaca by Coller (2011) are related to the regional horst-and-graben development and likely to be purely extensional with possibly a component of right lateral movement, or transtensional.

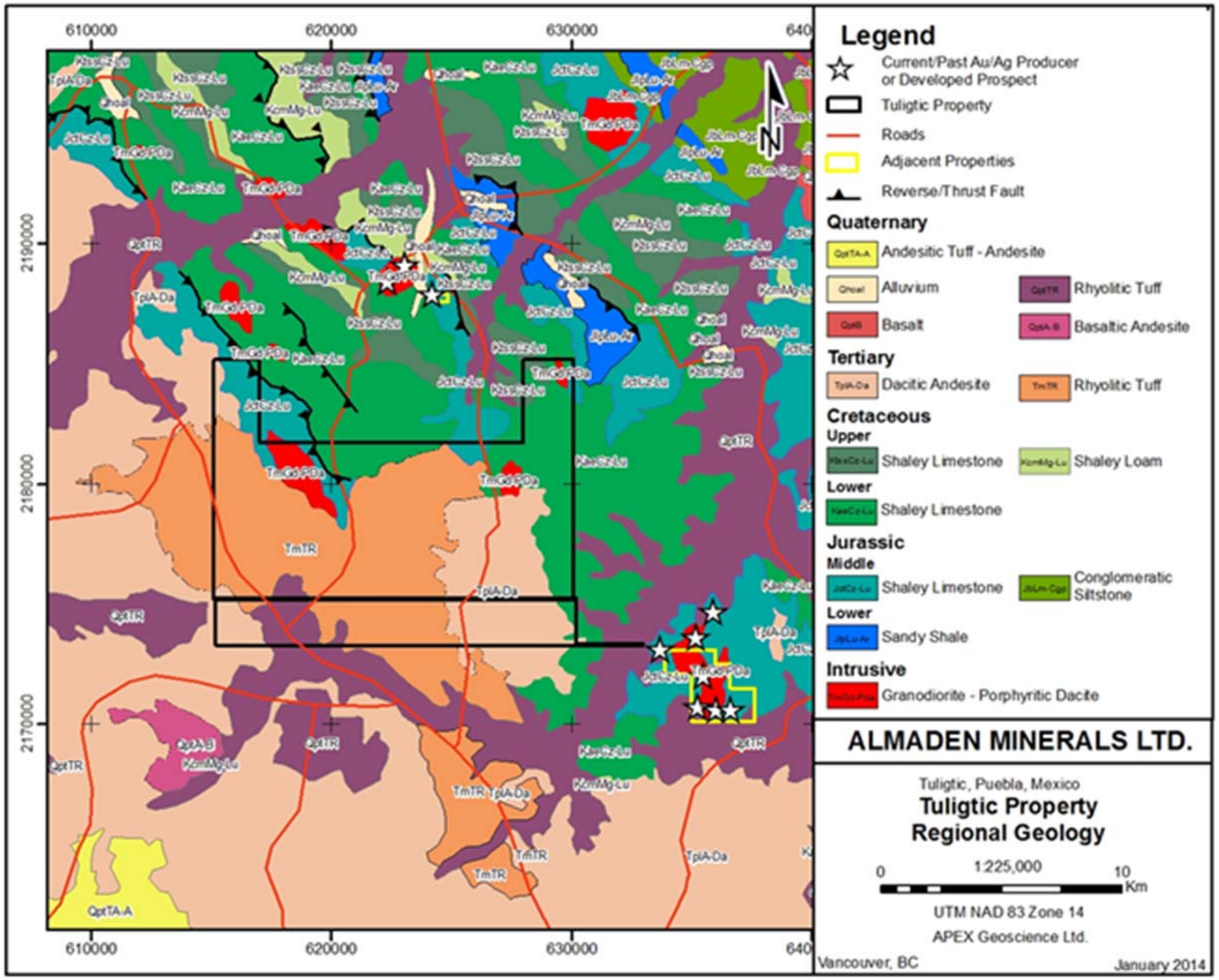


Figure 7-1 Regional Geology

7.2 Property Geology

The stratigraphy of the Tuligtic area can be divided into two main sequences: a Mesozoic sedimentary rock sequence related to the Zongolica basin and a sequence of late Tertiary igneous extrusive rocks belonging to the TMVB (Fuentes-Peralta & Calderon, 2008; Tritlla et al., 2004). The sedimentary sequence is locally intruded by plutonic rocks genetically related to the TMVB (Figure 7-2). The sedimentary complex at Tuligtic corresponds to the Upper Tamaulipas formation (Reyes-Cortes 1997). This formation, Late Jurassic to Early Cretaceous in age, is regionally described (Reyes-Cortes, 1997) as a sequence of grey-to-white limestone, slightly argillaceous, containing bands and nodules of black flint. The drilling conducted by Almaden allows for more detailed characterisation of the Upper Tamaulipas Formation carbonate units in the Tuligtic area. The sequence on the Project consists of clastic calcareous rocks. An argillaceous limestone (termed mudstone) grades into what have been named transition units and shale. The transition units are calcareous siltstones and grainstones. These rocks are not significant in the succession but mark the transition from mudstone to underlying calcareous shale. Typical of the transition units are coarser grain sizes. The lower calcareous “shale” units’ exhibit pronounced laminated bedding and is typically dark grey to black in colour, although there are green coloured beds as well. The shale units appear to have been subjected to widespread calc-silicate alteration.

Both the shale and transition units have very limited surface exposure and may be recessive. The entire carbonate package of rocks have been intensely deformed by the Laramide orogeny, showing complex thrusting and chevron folding in the hinge zones of a series of thrust-related east verging anticlines in the Ixtaca area (Tritlla et al., 2004; Coller, 2011). The calcareous shale units appear to occupy the cores of the anticlines while the thick bedded limestone/mudstone units occupy the cores of major synclines identified in the Ixtaca zone.

The Tamaulipas limestones are intruded in the mid-Miocene by a series of magmatic rocks. The compositions are very variable, consisting of hornblende-biotite-bearing tonalites, quartz-plagioclase-hornblende diorites, and, locally, aphanitic diabase dykes (Carrasco-Nunez et al., 1997). In the central part of the Tuligtic Property porphyry mineralization is hosted by and associated with a hornblende-biotite-quartz phyric granodiorite body. The contact between the granodiorite and the limestone is marked by the development of a prograde skarn.

In the Ixtaca epithermal area of the Project, the limestone basement units are crosscut by intermediate dykes that are often intensely altered. In the vicinity of the Ixtaca zone these dykes are well mineralized especially at their contacts with limestone country rock. Petrography has shown that epithermal alteration in the dykes, marked by illite, adularia, quartz and pyrite overprints earlier calc-silicate endoskarn mineralogies (Leitch, 2011). Two main orientations are identified for dykes in the Ixtaca area; 060 degrees (parallel to the Main Ixtaca and Ixtaca North zones) and 330 degrees (parallel to the Chemalaco Zone).

An erosional unconformity surface has been formed subsequent to the intrusion of the porphyry mineralization-associated granodiorites. This paleo topographical surface locally approximates the current topography. Although not well exposed the unconformity is marked by depression localised accumulations of basal conglomerate comprised of intrusive and sedimentary boulders.

This deformed Mesozoic sedimentary sequence is discordantly overlain by late Cenozoic extrusive rocks whose genetic and tectonic interrelations are yet to be fully explained. Two main volcaniclastic units are recognized in the area of Tuligtic: the Coyoltepec Pyroclastic deposit and the Xaltipan Ignimbrite (Carrasco-Nunez et al., 1997). Both units are covered by a thin (up to 1m) quaternary ‘tegument’ (Morales-Ramirez 2002) of which only a few patches are left in the area of the Property, but it is still widespread in the surrounding areas. This tegument is unconsolidated and composed of a very recent ash fall tuff rich in heavy minerals (mainly magnetite, apatite, and pyroxene).

The extensively altered pre-mineral Coyoltepec pyroclastic deposit is divided by Carrasco-Nunez et al. (1997) into two subunits: the lower Coyoltepec subunit, which is not exposed in the area of the Project, consists of a stratified sequence of surge deposits and massive, moderately indurated pyroclastic flow deposits with minor amounts of pumice and altered lithic clasts.

The upper Coyoltepec subunit, the main unit outcropping in the Tuligtic area, consists of a basal breccia or conglomerate overlain by bedded crystal tuff. The basal breccia is comprised of a lithic rhyolite tuff matrix composed of massive, indurated, coarse-gravel sized, lithic-rich pyroclastic flow deposits with pumice, andesitic fragments, free quartz, K-feldspar, plagioclase crystals, and minor amounts of limestone and shale clasts (Tritlla et al., 2004). The Coyoltepec volcanics are altered and mineralized. Gold silver mineralization is marked by widespread disseminated pyrite and quartz-calcite veinlets. The Coyoltepec volcanics are locally oxidised and weathered near surface and along structures.

The post-mineral Xaltipan ignimbrite is not seen in the Ixtaca area and mainly found in topographic lows south of the Tuligtic Property. It consists of a very recent (0.45 ± 0.09Ma, Carrasco-Nunez et al., 1997), pinkish to brownish-grey rhyolitic ignimbrite unit with different grades of welding, containing abundant pumice fragments, andesite lithic fragments, and small clasts of black obsidian (Tritlla et al., 2004).

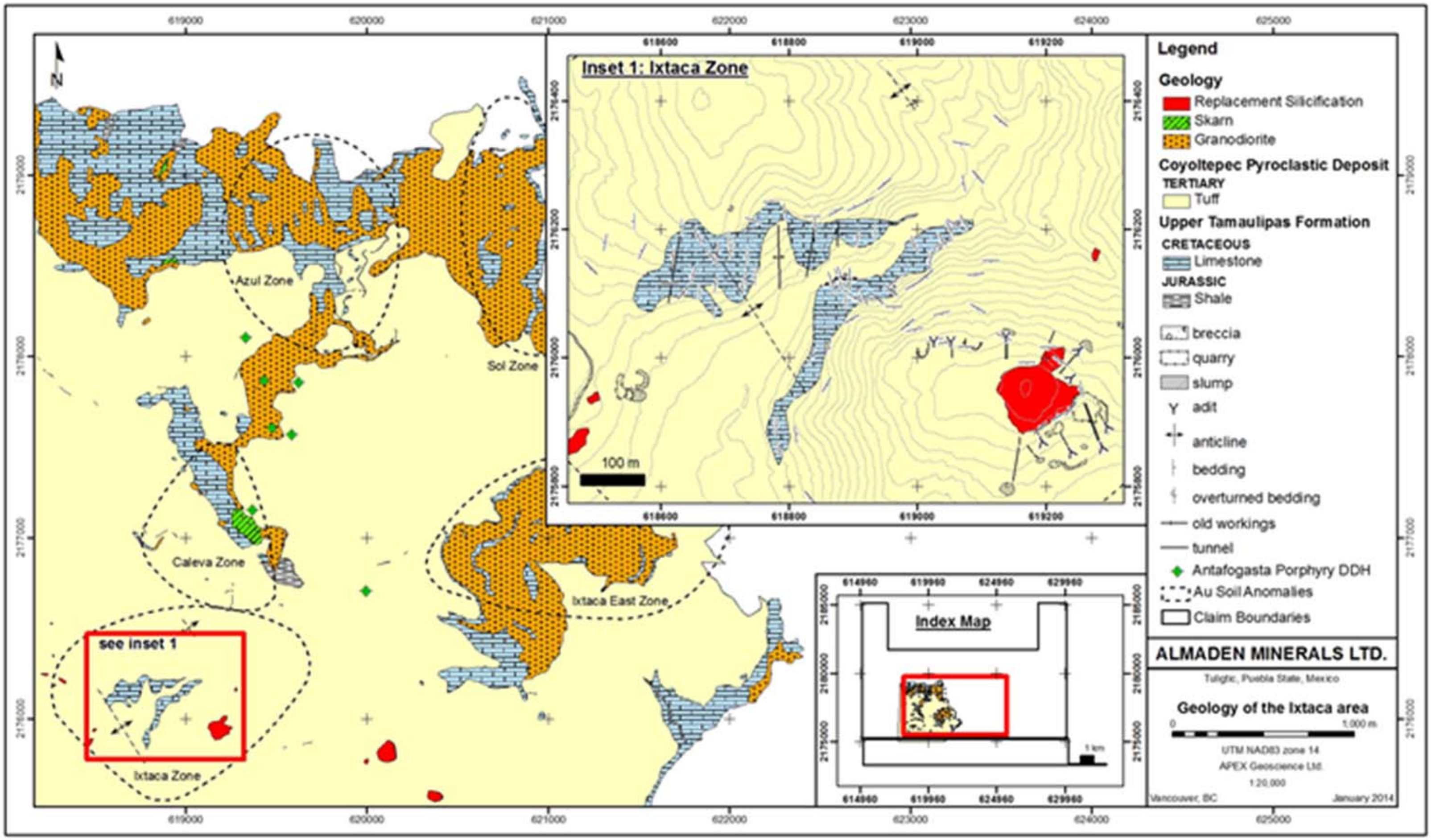


Figure 7-2 Geology of the Ixtaca Area

7.3 Mineralization

Two styles of alteration and mineralization are identified in the area: (1) copper- molybdenum porphyry style alteration and mineralization hosted by diorite and quartz- diorite intrusions; (2) silver-gold low-sulphidation epithermal quartz-bladed calcite veins hosted by carbonate rocks and spatially associated with overlying volcanic hosted texturally destructive clay alteration and replacement silicification.

Outcropping porphyry-style alteration and mineralization is observed in the bottoms of several drainages where the altered intrusive complex is exposed in erosional windows beneath post mineral unconsolidated ash deposits. Multiple late and post mineral intrusive phases are identified crossing an early intensely altered and quartz-veined medium-grained feldspar phyric diorite named the Principal Porphyry. Other intrusive types include late and post mineral mafic dykes and an inter-mineral feldspar-quartz phyric diorite. Late mineral mafic dykes are fine grained and altered to chlorite with accessory pyrite. Calc-silicate (garnet-clinopyroxene) altered limestone occurs in proximity to the intrusive contacts and is crosscut by late quartz-pyrite veins. Early biotite alteration of the principal porphyry consists of biotite-orthoclase flooding of the groundmass. Quartz veins associated with early alteration have irregular boundaries and are interpreted to be representative of A-style porphyry veins. These are followed by molybdenite veins which are associated with the same wall rock alteration. Chalcopyrite appears late in the early alteration sequence. Late alteration is characterized by intense zones of muscovite-illite-pyrite overprinting earlier quartz-K-feldspar-pyrite ± chalcopyrite veining and replacing earlier hydrothermal orthoclase and biotite. Stockwork quartz-pyrite crosscuts the A-style veins and is associated with muscovite-illite alteration of biotite. The quartz-sericite alteration can be texturally destructive resulting in white friable quartz-veined and pyrite rich rock. Pyrite is observed replacing chalcopyrite and in some instances chalcopyrite remains only as inclusions within late stage pyrite grains.

Epithermal mineralization on the Tuligtic Property is considered to have no genetic relationship to the porphyry alteration and mineralization described above. The epithermal system is well preserved and there is evidence of a paleosurface as steam heated kaolinite and replacement silica alteration occur at higher elevations where the upper part of the Coyoltepec pyroclastic deposit is preserved.

The veining of Ixtaca epithermal system displays characteristics representative of intermediate and low sulphidation deposits. These include typical mill feed and gangue mineralogy (electrum, sphalerite, galena, adularia, and carbonates), mineralization dominantly in open space veins (colloform banding, cavity filling). Assaying has indicated high contents of gold and silver. The high gold contents are rare in Mexico, where epithermal systems are dominantly silver-rich. Mineralized hydrothermal breccias showing multiphase development are commonly encountered within the main veins. Hydrothermal silicic/carbonate breccia zones occur within the limestone and dip steeply. These breccias are dominantly controlled by the main faults.

The Upper Tamaulipas formation, the dykes that crosscut it and the upper Coyoltepec volcanic subunit are the main host rocks to the epithermal vein system at Ixtaca. In the Main and Ixtaca North zones, veining strikes dominantly ENE-WNW (060 degrees) parallel to a major dyke trend and at a very high angle to the N to NNW bedding and fold structures within the limestones. The veins of the Chemalaco Zone are hosted by the shaley carbonate units and strike to the NNW, dipping to the SSW. In the footwall to Chemalaco Zone a parallel dyke has been identified which is altered and mineralized. The Chemalaco Zone and the dyke are interpreted to strike parallel to bedding and to core an antiform comprised of shale.

There appear to be two major sets of veins which are related to the large structural setting. The main set of veins strike ENE (060 degrees) and dip steeply to the north and south and are hosted by limestone and dykes that crosscut the limestone. The second set of veins strike NNW (330 degrees) and dip shallowly to the west and is likely related to pre-existing bedding and structures within the limestone and shale units. The Chemalaco Zone of veining strikes NNW (330 degrees) and is hosted by west dipping shale interpreted to core an overturned antiform.

Studies of mineral assemblages in hand specimen, transmitted and reflected light microscopy and SEM analyses have been carried out in order to construct a paragenetic sequence of mineral formation. This work completed by Herrington (2011) and Staffurth (2012) reveals that veining occurs in three main stages. The first stage is barren calcite veining. This is followed by buff brown and pink colloform carbonate and silicate veins containing abundant silver minerals and lower gold. The third stage of veining contains both gold and silver mineralization. The dominant gold-bearing mineral is electrum, with varying Au:Ag ratios. The majority of grains contain 40-60wt (weight) % gold but a few have down to 20wt% (Staffurth, 2012). Gold content occasionally varies within electrum grains, and some larger grains seem to be composed of aggregates of several smaller grains of differing composition (Staffurth, 2012). Electrum often appears to have been deposited with late galena-clausthalite both of which are found as inclusions or in fractures in pyrite. It is also closely associated with silver minerals as well as sphalerite and alabandite. Gold is also present in uytenbogaardtite (Ag3AuS2). This mineral is associated with electrum, chalcopyrite, galena, alabandite, silver minerals, and quartz in stage three mineralization (Herrington, 2011; Staffurth, 2012). Apart from electrum, the dominant silver bearing minerals are polybasite (-pearceite) and argentian tetrahedrite plus minor acanthite-naumannite, pyrargyrite and stephanite. They are associated with sulphides (Figure 8-1) or are isolated in gangue minerals (Staffurth, 2012).

The vein-related mineralization at Ixtaca does not have hard geologic boundaries. The mineralized zones are essentially vein zones, the outer boundaries of which are grade boundaries associated with decreased vein density.

7.3.1 Steam Heated Alteration, Replacement Silification and Other Surficial Geothermal Manifestations

One of the most striking features of the Ixtaca epithermal system is the kaolinite alteration, replacement silicification, and sinter carapace that remains uneroded in the vicinity of the Ixtaca Zone. This alteration has been identified over a roughly 5 x 5km area and is interpreted to represent the upper levels of a preserved epithermal system. All three alteration types have formed in the tuffaceous units. When the source alkali- choride epithermal fluids boil, along with water vapour, CO_2 and H_2S also separate. These gases rise and above the water table H_2S condenses in the vadose zone forming H_2SO_4. Near surface the H_2SO_4 alters volcanic rocks to kaolinite and alunite and can dissolve volcanic glass (Hedenquist and Henley 1985b). This process is interpreted to be responsible for the kaolinite alteration, known as steam-heated alteration in the economic geology literature (eg. White and Hedenquist, 1990). The resulting silica laden fluid can transport and re precipitate silica at the water table in permeable host rocks. This mechanism can result in large tabular alteration features often referred to as a silica caps. Since gold is not transported by the gases or sulphuric acid, the silica cap is usually devoid of gold and silver, which is the case at Ixtaca (White and Hedenquist, 1990).

Sinter is diagnostic of modern epithermal systems where silica-rich fluids emanate as hot springs at the earth's surface. Sinters are the highest level manifestation of an epithermal system and consequently the first feature to be removed by erosion. Most epithermal gold-silver deposits that have been recognized show some degree of erosion and ancient sinters are typically poorly preserved in the geological record. The presence of preserved steam heated and replacement silica alteration and sinter at Ixtaca is thus a clear indication that the deposit has not been significantly affected by erosion. At Ixtaca, the sinter facies and replacement silicification, where preserved, are located within the altered volcanic units.

8 DEPOSIT TYPES

The principal deposit-type of interest on the Tuligtic Property is low- to intermediate- sulphidation epithermal gold-silver mineralization. This style of mineralization is recognised at the Ixtaca Zone but property scale high level epithermal alteration suggests that mineralization of this type can exist elsewhere on the Project. These deposits are described more fully below. The Tertiary bodies intruding the Tamaulipas Limestones and the tertiary volcanics, makes the Property also prospective for Porphyry copper-gold-molybdenum (Cu-Au-Mo) and peripheral Pb-Zn Skarn deposits.

8.1 Epithermal Gold-Silver Deposits

Gold and silver deposits that form at shallow crustal depths (<1,500m) are interpreted to be controlled principally by the tectonic setting and composition of the mineralizing hydrothermal fluids. Three classes of epithermal deposits (high-sulphidation, intermediate-sulphidation and low-sulphidation) are recognized by the oxidation state of sulphur in the mineralogy, the form and style of mineralization, the geometry and mineralogy of alteration zoning, and the mill feed composition (Hedenquist et al., 2000; Hedenquist and White, 2005). Overlapping characteristics and gradations between epithermal classes may occur within a district or even within a single deposit. The appropriate classification of a newly discovered epithermal prospect can have important implications to exploration.

High-sulphidation and intermediate-sulphidation systems are most commonly hosted by subduction-related andesite-dacite volcanic arc rocks, which are dominantly calc-alkaline in composition. Low-sulphidation systems are more restricted, generally to rift-related bimodal (basalt, rhyolite) or alkalic volcanic sequences. The gangue mineralogy, metal contents and fluid inclusion studies indicate that near neutral pH hydrothermal fluids with low to moderate salinities form low- and intermediate-sulphidation class deposits whereas high-sulphidation deposits are related to more acidic fluids with variable low to high salinities. Low- and intermediate-sulphidation deposits are typically more vein-style while high-sulphidation deposits commonly consist primarily of replacement and disseminated styles of mineralization with subordinate veining. The characteristics of silver-gold mineralization in the Ixtaca Zone include banded, colloform and brecciated carbonate-quartz veining including locally abundant Mn-carbonate and rhodochrosite indicate that this is primarily an intermediate-sulphidation epithermal district.

The mineralization discovered to date at Ixtaca exhibits features of both the low- and intermediate sulphidation epithermal classes (see Table 8-1). Several of the larger examples of this deposit type occur in Mexico and include the prolific historic epithermal districts of Pachuca, Guanajuato and Fresnillo.

Table 8-1 Classification of Epithermal Deposits

	Low-Sulphidation	Intermediate-Sulphidation	High-Sulphidation
Metal Budget	Au- Ag, often sulphide poor	Ag - Au +/- Pb - Zn; typically sulphide rich	Cu - Au - Ag; locally sulphide-rich
Host Lithology	bimodal basalt-rhyolite sequences	andesite-dacite; intrusion centred district	andesite-dacite; intrusion centred district
Tectonic Setting	rift (extensional)	arc (subduction)	arc
Form and Style of Alteration/ Mineralization	vein arrays; open space veins dominant; disseminated and replacement mill feed minor stockwork mill feed common; overlying sinter common; bonanza zones common	vein arrays; open space veins dominant; disseminated and replacement mill feed minor; stockwork mill feed common; productive veins may be km-long, up to 800m in vertical extent	veins subordinate, locally dominant; disseminated and replacement mill feed common; stockwork mill feed minor.
Alteration Zoning	mill feed with quartz-illite-adularia (argillic); barren silicification and propylitic (quartz-chlorite-calcite +/- epidote) zones; vein selvedges are commonly narrow	mill feed with sericite-illite (argillic-sericitic); deep base metal-rich (Pb-Zn +/- Cu) zone common; may be spatially associated with HS and Cu porphyry deposits	mill feed in silicic core (vuggy quartz) flanked by quartz-alunite-kaolinite (advanced argillic); overlying barren lithocap common; Cu-rich zones (enargite) common
Vein Textures	chalcedony and opal common; laminated colloform-crustiform; breccia; bladed calcite (evidence for boiling)	chalcedony and opal uncommon; laminated colloform-crustiform and massive common; breccias; local carbonate-rich, quartz-poor veins; rhodochrosite common, especially with elevated base metals	chalcedony and opal uncommon; laminated colloform-crustiform veins uncommon; breccia veins; rhodochrosite uncommon
Hydrothermal Fluids	low salinity, near neutral pH, high gas content (CO_2, H_2S); mainly meteoric	moderate salinities; near neutral pH	low to high salinities; acidic; strong magmatic component?
Examples	McLaughlin, CA; Sleeper and Midas, NV; El Penon, Chile; Hishikari, Japan	Arcata Peru; Fresnillo Mexico; Comstock NV; Rosia Montana Romania	Pierina Peru; Summitville CO

**Altered after Taylor, 2007*

The low- and intermediate-sulphidation epithermal gold-silver deposits are generally characterised by open space fill and quartz-carbonate veining, stockworks and breccias associated with gold and silver often in the form of electrum, argentite and pyrite with lesser and variable amounts of sphalerite, chalcopyrite, galena, rare tetrahedrite and sulphosalt minerals, which form in high-level (epizonal) to near-surface environments.

The epithermal veins form when carbonate minerals and quartz precipitate from a cooling and boiling alkali-chloride fluid. Alkali-chloride geothermal fluids are formed from magmatic gases and convecting groundwater and are near neutral in composition. These fluids convect in the upper crust perhaps over a 10 kilometer deep vertical interval and can transport gold, silver and other metals. At roughly 2km depth, these fluids begin to boil, releasing CO_2 and H_2S (carbon-dioxide and hydrogen-sulphide). Both these now separated gases form separate fluids, each forming alteration zones with distinct mineralogy (Hedenquist et al., 2000).

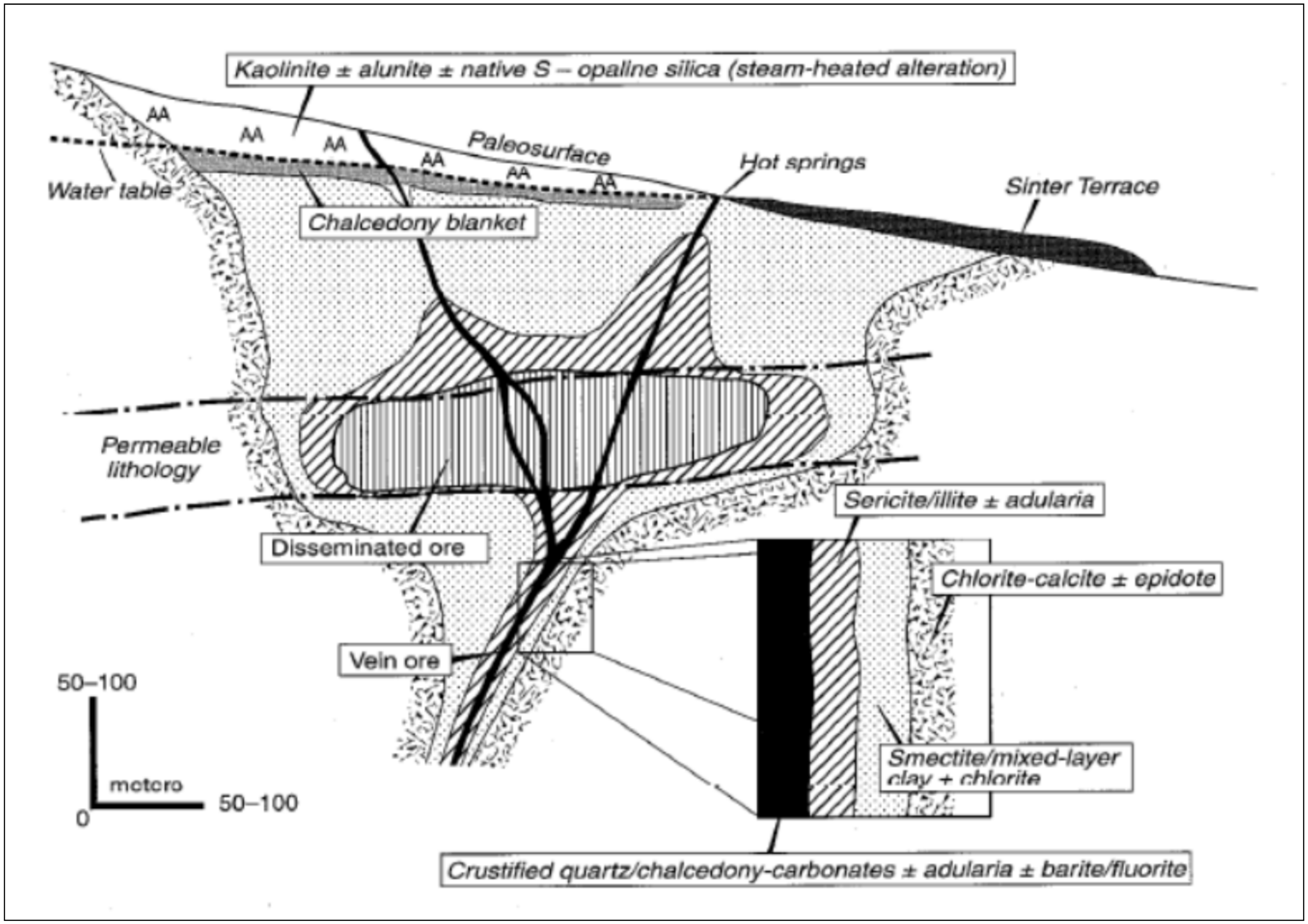
Above the water table H_2S condenses in the vadose zone to form a low pH H_2SO_4 (hydrogen-sulphate) dominant acid sulphate fluid (Hedenquist and White, 1990). These fluids can result in widespread tabular steam-heated alteration zones dominated by fine grained and friable kaolinite and alunite. Steam-heated waters collect at the water table and create aquifer-controlled strataform blankets of dense silicification known as silica caps (Shoenet al., 1974; Hedenquist et al.,, 2000). Since gold is not transported by the gases or sulphuric acid, the silica cap and overlying kaolinite alteration is usually devoid of gold and silver (Hedenquist et al. 2000).

Bicarbonate fluids are the result of the condensation of CO_2 in meteoric water. These fluids are also barren of gold and silver and generally form carbonate dominated alteration on the margins of the geothermal cell.

As the source alkali chloride fluids boil and cool quartz and carbonate deposit in the fractures along which the fluids are ascending to form banded carbonate-quartz veins. Gold and silver present within the fluid also precipitate in response to the boiling of the fluid. Potassium-feldspar adularia is also a common mineral that deposits in the veins in response to boiling. As carbonate and quartz precipitates individual fractures can be sealed and the boiling fluid must then find another weak feature to continue rising. Gases which accumulate beneath the sealed fracture causes the pressure to increase until the seal is broken. This results in a substantial change in pressure, which propagates catastrophic boiling in turn causing gold, bladed calcite, and amorphous silica to precipitate rapidly. Once the fluids return to equilibrium the quartz crystals again precipitate under passive conditions and seal the vein again until the process recurs. This episodic sealing and fracturing results in the banded textures common in these vein systems.

Mill feed zones are typically localized in structures, but may occur in permeable lithologies. Upward-flaring mill feed zones centred on structurally controlled hydrothermal conduits are typical. Large (bigger than 1m wide and hundreds of metres in strike length) to small veins and stockworks are common with lesser disseminations and replacements. Vein systems can be laterally extensive but mill feed shoots have relatively restricted vertical extent. High-grade ores are commonly found in dilational zones in faults at flexures, splays and in stockworks.

These deposits form in both subaerial, predominantly felsic, volcanic fields in extensional and strike-slip structural regimes and island arc or continental andesitic stratovolcanoes above active subduction zones. Near-surface hydrothermal systems, ranging from hot spring at surface to deeper, structurally and permeability focused fluid flow zones are the sites of mineralization. The mill feed fluids are relatively dilute and cool solutions that are mixtures of magmatic and meteoric fluids. Mineral deposition takes place as the solutions undergo cooling and degassing by fluid mixing, boiling and decompression.



*Hedenquist, 2000

Figure 8-1 Schematic Cross-section of an Epithermal Au-Ag Deposit

8.2 Porphyry Copper-Gold-Molybdenum and Lead-Zinc Skarn Deposits

In Porphyry Cu-Au-Mo deposit types, stockworks of quartz veinlets, quartz veins, closely spaced fractures, and breccias containing pyrite and chalcopyrite with lesser molybdenite, bornite and magnetite occur in large zones of economically bulk-mineable mineralization in or adjoining porphyritic intrusions and related breccia bodies. Disseminated sulphide minerals are present, generally in subordinate amounts. The mineralization is spatially, temporally and genetically associated with hydrothermal alteration of the host rock intrusions and wall rocks.

These deposit types are commonly found in orogenic belts at convergent plate boundaries, commonly linked to subduction-related magmatism. They also occur in association with emplacement of high-level stocks during extensional tectonism related to strike-slip faulting and back-arc spreading following continent margin accretion (Panteleyev, 1995).

Many Au skarns are related to plutons formed during oceanic plate subduction, and there is a worldwide spatial, temporal and genetic association between porphyry Cu provinces and calcic Au skarns. The Au skarns are divided into two types. Pyroxene-rich Au skarns tend to be hosted by siltstone-dominant packages and form in hydrothermal systems that are sulphur-rich and relatively reduced. Garnet-rich Au skarns tend to be hosted by carbonate-dominant packages and develop in more oxidizing and/or more sulphur-poor hydrothermal systems. The gold is commonly present as micron-sized inclusions in sulphides, or at sulphide grain boundaries. To the naked eye, mill feed is generally indistinguishable from waste rock. Due to the poor correlation between Au and Cu in some Au skarns, the economic potential of a prospect can be overlooked if Cu-sulphide-rich outcrops are preferentially sampled and other sulphide-bearing or sulphide-lean assemblages are ignored (Ray, 1998).

9 EXPLORATION

Between 2004 and 2013, Almaden's exploration at the Tuligtic Property has included rock and soil geochemical sampling, ground magnetics, IP and resistivity, Controlled Source Audio-frequency Magnetotelluric (CSAMT), and Controlled Source Induced Polarization (CSIP) geophysical surveys. The work to date has resulted in the identification of five anomalous areas: the Ixtaca, Ixtaca East, Caleva, Azul, and Sol zones (Figure 7-2 and Figure 9-1). Detailed exploration results for the Tuligtic Property have been disclosed in a previous Technical Report for the Tuligtic Property by Raffle et al. (2013) and are summarized below.

9.1 Rock Geochemistry

Between 2004 and 2014 a total of 468 rock geochemical samples have been collected on the Property over a 6 x 6km area. Rock sampling, guided by concurrent soil geochemical surveys, has been concentrated around the Ixtaca Zone and an area extending 4km to the NNE over the copper porphyry target located between the Caleva and Azul zone soil geochemical anomalies (Figure 7-2, Figure 9-1).

Rock grab samples collected by Almaden are from both from representative and apparently mineralized lithologies in outcrop, talus and transported boulders within creeks throughout the Property. Rock samples ranging from 0.5 to 2.5 kilograms (kg) in weight and are placed in uniquely labelled poly samples bags and their locations are recorded using handheld GPS accurate to plus or minus 5m accuracy.

Of the 468 rock grab samples collected, a total of 48 samples returned assays of greater than 100 parts-per-billion (ppb) gold (Au), and up to 6.14 grams-per-tonne (g/t) Au. A total of 51 rock samples returned assays of greater than 10g/t silver (Ag) and up to 600g/t Ag.

Gold and silver mineralization occurs within the Ixtaca Zone, and is associated with anomalous arsenic, mercury (± antimony). To the northeast of the Ixtaca Zone zinc, copper and locally anomalous gold, silver and lead (± arsenic) values occur in association with calc-silicate skarn and altered intrusive rocks.

Basement carbonate units, altered intrusive, and locally calc-silicate skarn mineralization occur as erosional windows beneath unmineralized tuff of the upper Coyoltepec subunit. Surface mineralization at the Ixtaca Zone occurs as limestone boulders containing quartz vein fragments and high level epithermal alteration within overlying volcanic rocks. Epithermal alteration and mineralization is observed overprinting earlier skarn and porphyry style alteration and mineralization. Numerous small skarn-related showings exist on the Project. At the Caleva soil anomaly, a 200 x 100m skarn zone hosts sphalerite, galena and chalcopyrite quartz vein stockwork mineralization along the contact zone between limestone and altered and mineralized intrusive rocks to the east.

9.2 Soil Geochemistry

The collection of 4,760 soil samples by Almaden between 2005 and 2011 resulted in the identification of five anomalous areas: the Ixtaca, Ixtaca East, Caleva, Azul, and Sol zones (Figure 7-2). During 2013, an additional 1,035 soil samples have been collected to extend soil grid lines to the west and locally infill existing grid lines, for a total of 5,795 soil samples.

Samples have been collected at 50m intervals along a series of 200m spaced east-west oriented lines. Infill lines spaced at 100m have been completed over gold and silver anomalies at the Caleva and Ixtaca East zones, and an unnamed anomaly 2.5km west of the Ixtaca Zone. Subsequently, detailed 50m x 50m grid sampling of the Ixtaca Zone and select grid infill of the Azul and Sol zones has been completed. Soil samples are collected by hand from a small hole dug with a non-metallic pick or hoe. The sample depth is typically 10cm, or at least deep enough to be below the interpreted surficial organic layer. Sample bags are labelled with a unique sample number.

Anomalous thresholds (greater than the 95th percentile) for gold and silver are calculated to be 17.1ppb Au and 0.59ppm Ag, respectively. A total of 288 samples contain anomalous Au, including 141 samples with coincident Ag anomalies.

The Ixtaca Zone produces the largest Au and Ag response within the Tuligtic Property (Figure 9-1). Base metals do not correlate significantly with the Ixtaca Zone, and Hg and Sb anomalies occur peripherally within altered volcanic rocks. Base metals correlate well with Au-Ag at the Caleva, Azul, and Sol zones to such an extent they are best termed Cu-Zn (Au-Ag) anomalies. Based on the distribution of soil geochemical anomalies and the mapped geology it is apparent that the overlying post mineral volcanics significantly suppress sedimentary and intrusive basement rock geochemical anomalies (Figure 7-2, Figure 9-1). Soil responses are consistent with these zones being prospective for both epithermal and earlier porphyry-skarn mineralization.

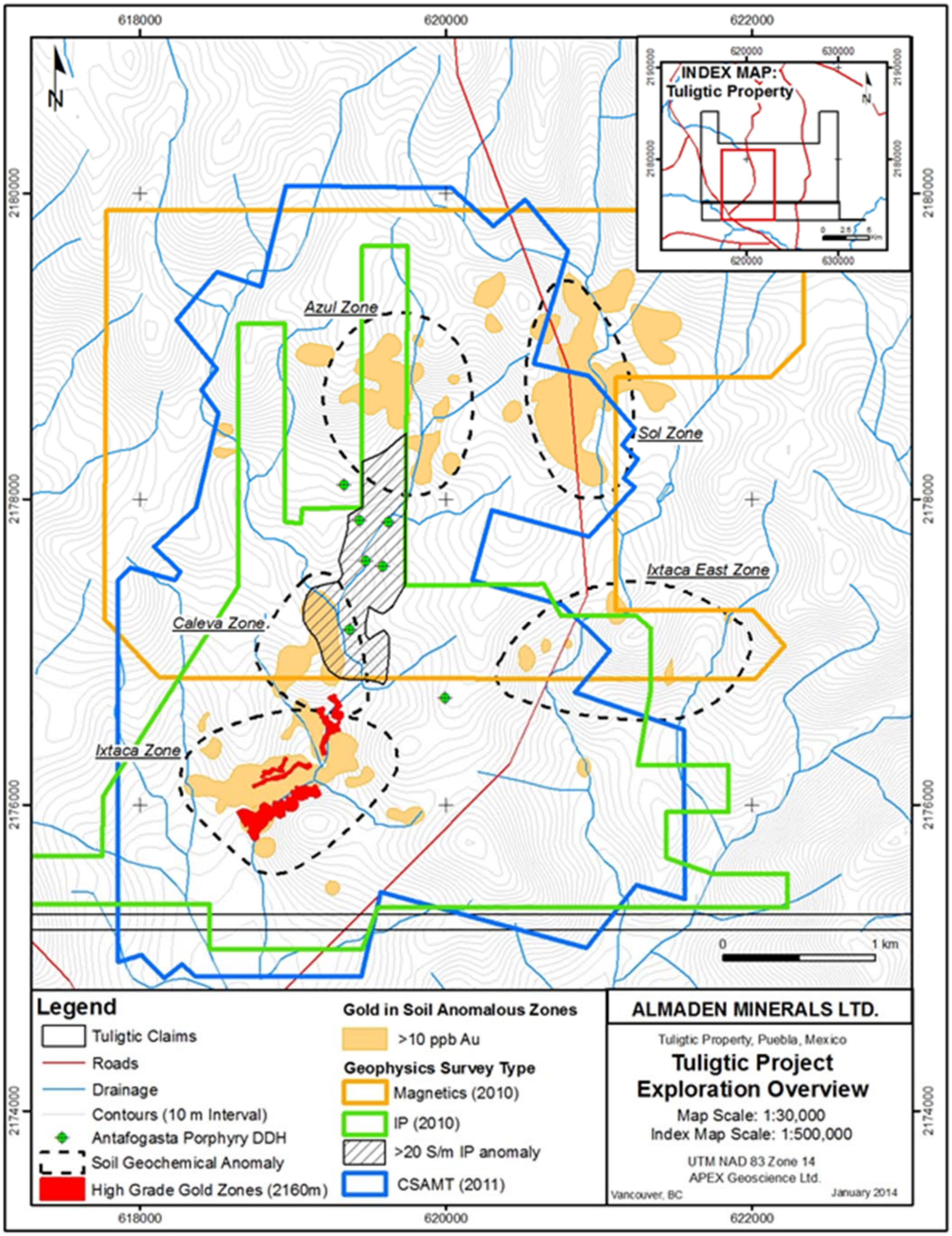


Figure 9-1 Exploration Overview Showing Gold in Soil Anomalies and Extent of Geophysical Surveys

9.3 Ground Geophysics

9.3.1 Magnetics

During 2010, Almaden completed an 84 line-km ground magnetic survey over a 4km by 4.5km area covering the copper porphyry target area north of the Ixtaca Zone (Figure 9-1). The survey comprised a series of 200m spaced east-west oriented lines with magnetic readings collected at 12.5m intervals along each line.

The survey identified a broad poorly defined, approximately 100 nano-Tesla (nT) magnetic high anomaly that corresponds in part with mapped altered quartz-monzonite porphyry rocks. Numerous, 30 to 50nT short strike length NNW trending linear magnetic high anomalies parallel the regional structural grain, and the strike of bedding within Upper Tamaulipas formation calcareous rocks suggesting structural and/or lithologic control of magnetic anomalies.

9.3.2 Induced Polarization/Resistivity

Concurrent with 2010 ground magnetic surveys, Almaden completed 108 line-km of 100m “a” spacing pole-dipole induced polarization (IP) / resistivity geophysical surveys over the Ixtaca and Caleva zones, and portions of the Azul and Ixtaca East zones (Figure 9-1). The survey employed a series of overlapping east-west and north-south oriented lines spaced at intervals of 100m.

The survey defines a 1,000 x 200m north-northwest trending 20 to 30mV/V chargeability anomaly coincident with mapped calc-silicate skarn mineralization and the Caleva Zone soil geochemical anomaly (Figure 9-1). While poorly constrained by a single north-south oriented survey line, the anomaly extends a further 1 km north over the porphyry copper anomaly area. Partial survey coverage of the Ixtaca East Zone multi-element soil geochemical anomaly defines a 700 x 500m elliptical 7 to 15mV/V chargeability anomaly along its western margin.

Resistivity anomalies appear to be controlled in part by topographic lows that down-cut through overlying tuff rocks and expose more resistive basement lithologies. Resistivity low (conductive) anomalies are common along local topographic high ridges and plateaus where significant thicknesses of more conductive tuff rocks remain.

9.3.3 CSAMT/CSIP

During 2011, Zonge International Inc. on behalf of Almaden completed a Controlled Source Audio-frequency Magnetotelluric (CSAMT) and Controlled Source Induce Polarization (CSIP) geophysical survey at the Tuligtic Property over a 6 by 4km area (Figure 9-1).

The survey totalled 48.5 line-km, including six lines oriented N-S (N16E azimuth, CSAMT and CSIP), and eight perpendicular E-W oriented lines (N104E azimuth, CSAMT only). Survey line spacing varied from 170 to 550m utilizing an array of six 25m dipoles.

2-D (N-S Line) smooth-model resistivity data defines a NW trending resistivity anomaly west of the Ixtaca Main Zone, and an E-W trending resistivity anomaly through the Ixtaca Zone. The NW trending anomaly passes through drill sections 10+200E to 10+400E, and may reflect limestone rocks on the west limb of an east-verging antiform. A similar NW trending conductive anomaly immediately to the east may represent calcareous shale rocks within the core of the antiform. The significance of the E-W trending anomaly is not known given the context of the current geologic model.

2-D (E-W Line) smooth-model resistivity data shows a strong resistivity anomaly associated with the core of the Ixtaca Main Zone, and surface outcropping limestone. To the northeast, a resistivity anomaly coincident with the Chemalaco Zone may reflect complex structural geology patterns and the relatively resistive limestone and Chemalaco Dyke lithologies.

CSIP data does not appear to have identified significant anomalies.

10 DRILLING

10.1 Introduction

The purpose of the 2014 Technical Report is to provide a technical summary and updated mineral Resource Estimate with respect to the Ixtaca Deposit in relation to diamond drilling completed subsequent to the November 13, 2012 cut-off date of the maiden mineral Resource Estimate (Raffle et al., 2013). Since 2010, a total of 475 diamond drillholes have been drilled at the Tuligtic Property, totalling 154,566m (Figure 10-1). Drilling progress since 2010 is summarized below (Table 10-1).

The Main Ixtaca Zone of mineralization has been defined as a sub-vertical body trending northeast over a 650m strike length (Figure 10-1). The Ixtaca North Zone has been further defined over a 400m strike length as two discrete parallel sub-zones having a true-thickness of 5 to 35m, and spaced 20 to 70m apart (Figure 10-3). The Chemalaco Zone (Figure 10-1, Figure 10-4) is moderate to steeply WSW dipping that has been defined over a 450m strike length with high-grade mineralization intersected to a vertical depth of 600m or approximately 700m down-dip.

Table 10-1 Tuligtic Property Drilling Summary 2010-2015

Year	Holes Drilled (total m)	Main Ixtaca Zone	Ixtaca North Zone	Chemalaco Zone
2010	14 (6,465m)	- Discovered as sub-vertical body trending NE defined over 400m strike		
2011	85 (30,644m)	- Defined over 600m strike	- Discovered as parallel sub-vertical zone to Ixtaca Main	
2012	126 (44,862m)	- Defined over 650m strike - High-grade mineralization intersected to 300m	- Defined over 400m strike - High-grade mineralization intersected to 300m	- Discovered as a WSW moderate-steeply dipping body, defined over 350m strike, trending approximately N-S - High-grade mineralization intersected to 550m (600m down-dip)
2013	198 (55,467m)	- Tested over 1,000m strike - High-grade mineralization intersected to 300m	- Delineated as two distinct parallel zones - High-grade mineralization intersected to 32m	- Defined over 450m strike as splayed body dipping 55 degrees WSW with overall down-dip 700m - Splayed subzone dips 25-50 degrees, defined over 250m strike, 400m down-dip
2014	40 (13,967m; *includes 3 holes 1,359m at Azul Zone outside resource area)	- Metallurgical test holes twinning existing holes	- Exploration holes testing mineralization outside and at depth below PEA pit	- Exploration holes testing mineralization outside and at depth below PEA pit - Metallurgical test holes twinning existing holes
2015	12 (3,161m)	- Exploration holes testing mineralization outside and at depth below PEA pit - Metallurgical test holes twinning existing holes		- Exploration holes testing mineralization outside and at depth below PEA pit - Metallurgical test holes twinning existing holes

In July 2010 Almaden initiated a preliminary diamond drilling program to test epithermal alteration within the Tuligtic Property, resulting in the discovery of the Main Ixtaca Zone. The first hole, TU-10-001, intersected 302.42m of 1.01g/t Au and 48g/t Ag and multiple high grade intervals including 1.67m of 60.7g/t Au and 2,122g/t Ag. Almaden drilled 14 holes totalling 6,465m during 2010, defined the Main Ixtaca Zone over a 400m strike length, and initiated drilling along 50m NNW oriented sections. During

2011, Almaden drilled an additional 85 holes totalling 30,644m, which resulted in the discovery of the Ixtaca North Zone and testing of the Main Ixtaca Zone over a 600m strike length on 50m sections. Almaden discovered the Chemalaco Zone in early 2012 and continued drilling of the Ixtaca North and Main Ixtaca zones. Almaden drilled 126 holes totalling 44,862m on the Property from the beginning of 2012 until the November 13, 2012 maiden mineral Resource Estimate cut-off, for a total of 81,971m in 225 drillholes.

During 2013 and subsequent to the November 13, 2012 cut-off of the maiden mineral Resource Estimate, Almaden drilled 198 holes totalling 55,467m (423 holes in total up to the end of 2013 comprising the current Resource Estimate of Raffle and Giroux, 2014). A total of 79 holes have been drilled at the Main Ixtaca Zone, 40 holes at the Ixtaca North Zone and 79 holes at the Chemalaco Zone. Drilling during 2013 focused on expanding the deposit and upgrading resources previously categorized as Inferred to higher confidence Measured and Indicated categories.

Drilling during 2014 and 2015, subsequent to the current Resource Estimate, Almaden has completed 52 additional drill holes totalling 17,128m (49 within the Ixtaca Deposit and 3 exploration drill holes at the (Casa) Azul Zone; Figure 7-2). Of the holes drilled within the Ixtaca Deposit during 2014 and 2015, 11 were metallurgical holes that twinned existing holes. The remainder were exploration holes testing mineralized zones at depth. These holes all intersected mineralized zones below the PEA pit described in this report. Drilling at the Casa Azul zone returned intersected porphyritic intrusive and limestone-skarn mineralization returning locally elevated zinc, coper and silver values.

Of the 475 holes to date, approximately 212 holes have been completed on the Main Ixtaca Zone, 118 at the Ixtaca North Zone, and 142 at the Chemalaco Zone (Figure 10-1). The diamond drillholes range from a minimum length of 60m to a maximum of 701m, and average 325m. All drilling completed at the Ixtaca Zone has been diamond core of NQ2 size (5.08 cm diameter). Drilling has been performed using four diamond drills owned and operated by Almaden via its wholly owned operating subsidiary Minera Gavilán, S.A. de C.V. The 2010 through 2015 diamond drill programs have been completed under the supervision of Almaden personnel. Drillhole collars have been spotted using a handheld GPS and compass, and subsequently have been surveyed using a differentially corrected GPS. Each of the holes is marked with a small cement cairn inscribed with the drillhole number and drilling direction.

Drillholes have been surveyed down hole using Reflex EZ-Shot or EX-Trac instruments following completion of each hole. Down hole survey measurements have been spaced at 100m intervals during 2010 drilling and have been decreased to 50m intervals in 2011. During 2012 and 2013, select drillholes within all three mineralized zones have been surveyed at 15m intervals. All drilling during 2014 and 2015 were surveyed at 15m intervals. A total of 5,420 drillhole orientation measurements (excluding 475 collar surveys) have been collected for an average down hole spacing of 27m. A total of 35 drillholes (10,354m), apart from the collar survey, have not been surveyed downhole; and a total of five drillholes (1,672m) have been surveyed at the end of hole only. Drillholes having no down hole survey have been assumed to have the orientation of the collar. Drillhole data has been plotted in the field and has been inspected. Down hole data returning unrealistic hole orientations have been flagged and removed from the database. Down hole survey summary statistics are provided in Table 10-2, below.

At the rig, drill core is placed in plastic core boxes labeled with the drillhole number, box number, and an arrow to mark the start of the tray and the down hole direction. Wooden core blocks are placed at the end of each core run (usually 3m, or less in broken ground). Throughout the day and at the end of each shift drill core is transported to Almaden's Santa Maria core logging, sampling and warehouse facility.

Table 10-2 Tuligtic Property Down Hole Survey Statistics

	Number of Drillholes	Metres
Number of Down Hole Surveys	5,420	154,566
Average Survey Spacing (not including casing)	475	27
Drillholes (No Down Hole Survey)	35 (7%)	10,354
Drillholes (End Of Hole Survey Only)	5 (1%)	1,672
Drillholes (15m Survey Spacing)	272 (58%)	84,404
Drillholes (50m Survey Spacing)	139 (29%)	49,047
Drillholes (100m Survey Spacing)	24 (5%)	9,089

Geotechnical logging is comprised of measurements of total core recovery per-run, RQD (the total length of pieces of core greater than twice the core width divided by the length of the interval, times 100), core photography (before and after cutting), hardness testing and measurements of bulk density using the weight in air-weight in water method.

Drill core is logged based on lithology, and the presence of epithermal alteration and mineralization. All strongly altered or epithermal-mineralized intervals of core are sampled. Almaden employs a maximum sample length of 2 to 3m in unmineralized lithologies, and a maximum sample length of 1m in mineralized lithologies . During the years 2010 and 2011 Almaden employed a minimum sample length of 20cm. The minimum sample length was increased to 50cm from 2012 onwards to ensure the availability of sufficient material for replicate analysis. Geological changes in the core such as major alteration or mineralization intensity (including large discrete veins), or lithology are used as sample breaks.

The Upper Tamaulipas formation, the dykes that crosscut it and the upper Coyoltepec volcanic subunit are the main host rocks to the epithermal vein system at Ixtaca. In the Main and Ixtaca North zones veining strikes dominantly ENE-WNW (060 degrees) parallel to a major dyke trend and at a very high angle to the N to NNW bedding and fold structures within the limestones. The veins of the Chemalaco Zone are hosted by the shaley carbonate units and strike to the NNW, dipping to the SSW. In the footwall to Chemalaco Zone a parallel dyke has been identified which is altered and mineralized. The Chemalaco Zone and the dyke are interpreted to strike parallel to bedding and to core an antiform comprised of shale.

10.2 Main Ixtaca and Ixtaca North Zones

The Main Ixtaca and Ixtaca North zones have a strike length of approximately 650m and have been drilled at 25 and 50m section spacing. The vast majority of holes have been drilled at an azimuth of 150 or 330 degrees and at dips between 45 and 60 degrees from horizontal. Infill drilling at 25m sections has also been completed over the majority of the Ixtaca North Zone and in the central area of the Main Ixtaca Zone. Diamond drilling has intersected high-grade mineralization within the Main Ixtaca and Ixtaca North zones to depths of 200 to 300m vertically from surface. High-grade zones occur within a broader zone of mineralization extending laterally (NNW-SSE) over 1000m and to a vertical depth of 600m below surface (Table 10-3 and Figure 10-2).

The epithermal vein system at the Main Ixtaca and Ixtaca North zones is roughly associated with two parallel ENE (060 degrees) trending, subvertical to steeply north dipping dyke zones. The dykes predate mineralization and trend at a high angle to the N to NNW bedding and fold structures within calcareous sediments of the Upper Tamaulipas formation.

At the Main Ixtaca Zone, a series of dykes ranging from less than 2m to over 20m true width occur within an approximately 100m wide zone (Figure 10-2, Figure 10-3). Wider dykes often correlate within individual drill sections, where they are inferred to pinch or splay. The broader dyke zone itself is relatable between sections, although individual dykes are typically not continuous between sections. The dyke zone hosting the Ixtaca North Zone is narrower, comprising a steeply north-dipping zone of two or three discrete dykes ranging from 5 to 20m in width. Epithermal vein mineralization occurs both within the dykes and sedimentary host rocks, with the highest grades often occurring within or proximal to the dykes. Vein density decreases outward to the north and south from the dyke zones resulting in the formation of two high-grade zones that lack sharp geologic boundaries. The dykes are often intensely altered and are interpreted to control the distribution of epithermal vein system at Ixtaca to the extent that they provided a conduit for ascending hydrothermal fluids, and an important rheological contrast resulting in vein formation within and along the margins individual dykes, and laterally within the adjacent limestone. On surface, the Main Ixtaca and Ixtaca North zones are separated by a steep sided ENE trending valley (Figure 10-2, Figure 10-3).

The lateral (WSW-ENE) extent of the epithermal vein system is controlled by N to NNW bedding and fold structures in basement rocks of the Upper Tamaulipas formation. Drilling indicates Main Ixtaca and Ixtaca North zone mineralization is bound within an ENE-verging asymmetric synform. The synform is cored by a structurally thickened sequence of argillaceous limestone that grades laterally and at depth through calcareous siltstone and grainstone transition units, into dark grey to laminated calcareous shale at depth. Based on increased vein density, including the presence of broad alteration zones and networks of intersecting epithermal veins, the relatively brittle limestone is a preferential host to Main Ixtaca and Ixtaca North zone mineralization.

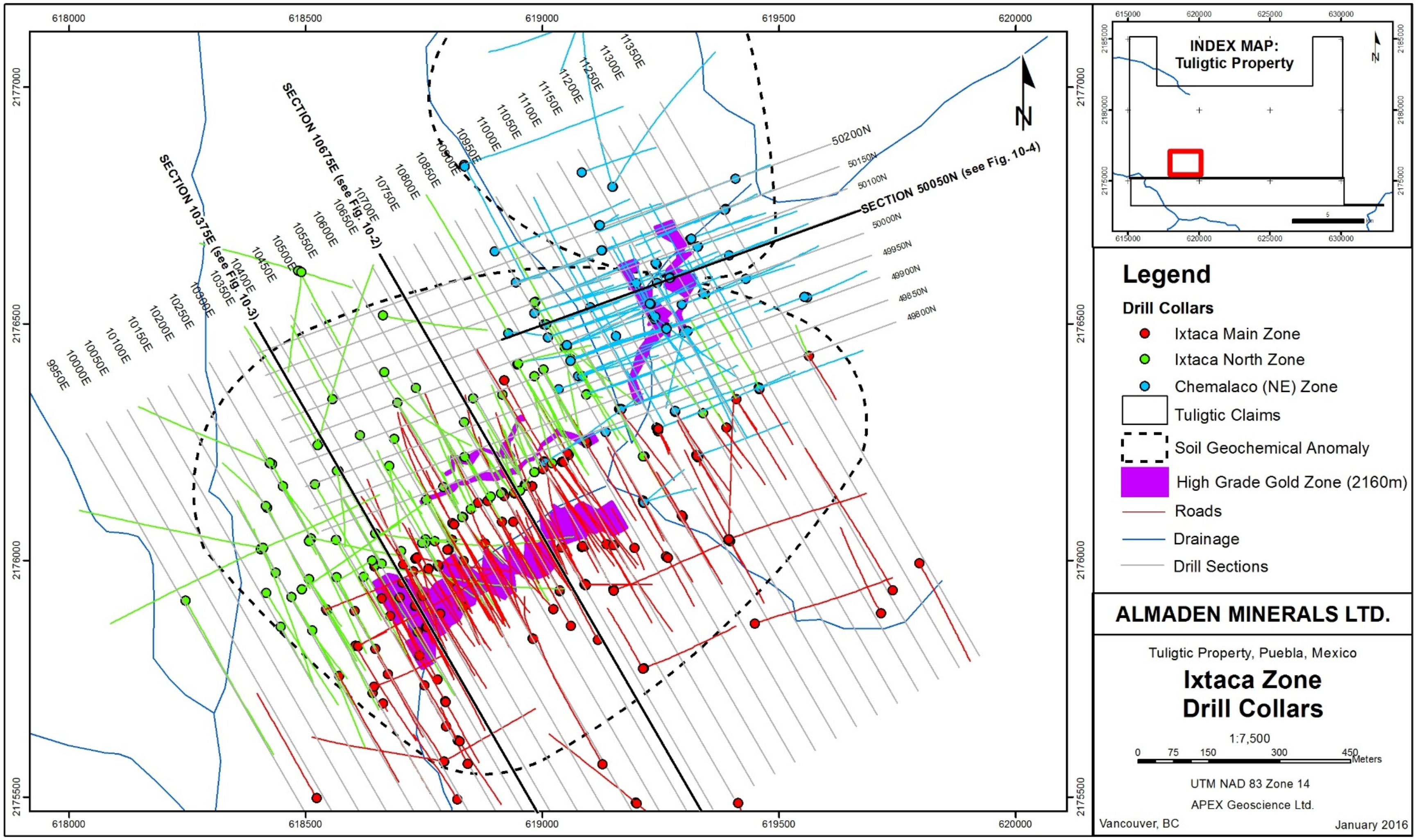


Figure 10-1 **Drillhole Locations**

Table 10-3 Section 10+675E Significant Drill Intercepts (Main Ixtaca and Ixtaca North Zones)

Hole ID	From (m)	To (m)	Interval (m)	Gold (g/t)	Silver (g/t)	AuEq* (g/t)
TU-12-120	260.90	290.90	30.00	0.74	96.7	2.6
including	260.90	266.10	5.20	2.78	437.0	11.3
TU-12-124	116.50	301.50	185.00	1.00	60.5	2.2
including	167.50	181.40	13.90	6.04	179.7	9.5
TU-12-127	155.95	186.00	30.05	0.70	56.7	1.8
including	174.00	186.00	12.00	1.05	105.7	3.1
TU-12-127	210.00	233.50	23.50	1.02	20.2	1.4
including	213.90	218.30	4.40	3.92	86.0	5.6
TU-12-127	243.00	285.60	42.60	0.57	10.8	0.8
TU-12-127	297.00	314.00	17.00	0.38	8.7	0.5
TU-12-132	64.50	204.20	139.70	0.22	18.0	0.6
including	137.00	166.60	29.60	0.35	27.8	0.9
including	148.25	153.30	5.05	1.16	79.0	2.7
including	174.40	204.20	29.80	0.33	34.1	1.0
TU-12-136	63.10	123.60	60.50	0.84	48.9	1.8
including	82.20	93.00	10.80	1.10	85.2	2.8
including	98.00	110.50	12.50	1.84	98.5	3.8
TU-12-138	43.50	87.27	43.77	0.59	4.3	0.7
including	61.00	71.50	10.50	0.88	4.9	1.0
including	84.00	87.27	3.27	2.07	10.5	2.3
TU-12-138	135.50	184.25	48.75	0.22	16.7	0.5
including	179.95	182.50	2.55	2.98	216.4	7.2
TU-12-138	202.00	359.50	157.50	0.36	41.4	1.2
including	264.30	359.50	95.20	0.54	61.1	1.7
including	292.50	302.00	9.50	1.27	234.3	5.8
including	304.00	307.00	3.00	3.87	439.9	12.4
TU-12-144	45.50	92.60	47.10	0.52	3.7	0.6
TU-12-144	210.00	258.00	48.00	0.52	32.0	1.1
including	227.40	235.80	8.40	1.68	59.3	2.8
TU-13-324	32.92	62.00	29.08	1.31	16.5	1.6
including	42.50	57.75	15.25	2.10	23.7	2.6
including	43.00	45.25	2.25	1.71	72.0	3.1
TU-13-324	113.50	128.00	14.50	0.25	47.0	1.2
including	120.00	121.00	1.00	0.59	117.5	2.9
including	125.00	128.00	3.00	0.79	155.0	3.8
TU-13-324	154.00	174.00	20.00	0.08	29.1	0.6
including	160.00	161.00	1.00	0.42	167.0	3.7
including	167.50	172.00	4.50	0.07	53.4	1.1
TU-13-325	128.50	136.50	8.00	0.58	132.2	3.2
TU-13-325	190.00	236.50	46.50	1.06	53.1	2.1
including	193.40	216.00	22.60	1.72	97.2	3.6
including	194.00	195.20	1.20	2.05	147.0	4.9
including	203.90	205.00	1.10	3.97	175.0	7.4
including	210.50	216.00	5.50	4.40	240.8	9.1
TU-13-388	199.00	229.50	30.50	0.67	23.9	1.1
TU-13-388	337.50	346.50	9.00	1.35	287.5	6.9

Hole ID	From (m)	To (m)	Interval (m)	Gold (g/t)	Silver (g/t)	AuEq* (g/t)
including	339.25	340.35	1.10	6.54	1982.7	**45.2**
TU-13-388	363.50	416.00	52.50	0.58	50.3	**1.6**
including	363.50	378.40	14.90	0.74	87.0	**2.4**
including	372.00	378.40	6.40	1.19	138.9	**3.9**
including	390.00	403.90	13.90	1.11	82.9	**2.7**
including	398.60	401.10	2.50	1.78	173.0	**5.1**

Table 10-4 Section 10+375E Significant Drill intercepts (Main Ixtaca Zone)

Hole ID	From (m)	To (m)	Interval (m)	Gold (g/t)	Silver (g/t)	AuEq* (g/t)
TU-11-065	26.00	126.80	100.80	0.58	46.2	**1.5**
including	26.00	74.78	48.78	0.95	77.0	**2.5**
including	43.60	68.00	24.40	1.67	134.4	**4.4**
including	49.80	59.80	10.00	3.05	198.8	**7.0**
TU-11-067	24.30	145.00	120.70	1.02	72.6	**2.5**
including	36.50	136.80	100.30	1.20	85.0	**2.9**
including	54.90	96.30	41.40	1.91	144.1	**4.8**
including	63.55	85.50	21.95	2.75	210.1	**7.0**
including	65.60	80.85	15.25	3.26	253.4	**8.3**
including	107.20	116.95	9.75	2.54	112.6	**4.8**
including	125.55	127.43	1.88	2.51	242.2	**7.3**
TU-12-202	26.50	66.50	40.00	0.35	1.4	**0.4**
including	26.50	38.00	11.50	0.78	0.5	**0.8**
TU-12-202	137.10	172.50	35.40	0.62	12.3	**0.9**
including	139.10	145.10	6.00	2.57	35.4	**3.3**
TU-12-202	249.30	260.80	11.50	0.10	16.7	**0.4**
TU-12-211	31.20	187.85	156.65	0.59	28.6	**1.2**
including	70.70	84.50	13.80	0.97	82.9	**2.6**
including	97.80	105.65	7.85	1.07	59.4	**2.3**
including	129.85	142.40	12.55	1.38	53.3	**2.4**
including	172.85	183.85	11.00	0.91	56.7	**2.0**
TU-13-389	21.34	95.50	74.16	1.02	50.9	**2.0**
including	47.00	71.00	24.00	1.52	60.6	**2.7**
including	51.50	69.00	17.50	1.92	64.4	**3.2**
including	88.60	95.50	6.90	2.54	139.9	**5.3**
TU-13-389	104.00	106.80	2.80	2.86	169.3	**6.2**
TU-13-391	16.00	126.00	110.00	0.62	42.0	**1.5**
including	48.16	89.50	41.34	1.16	76.2	**2.7**
including	48.16	59.30	11.14	1.79	110.9	**4.0**
including	71.80	84.50	12.70	1.40	106.4	**3.5**
including	71.80	74.50	2.70	3.06	230.3	**7.7**
TU-13-393	27.43	141.80	114.37	0.92	53.7	**2.0**
including	54.50	81.50	27.00	1.03	76.0	**2.6**
including	56.00	62.20	6.20	2.21	150.5	**5.2**
including	89.95	124.70	34.75	1.67	70.4	**3.1**
including	100.30	104.00	3.70	2.08	89.0	**3.9**
including	110.40	118.30	7.90	4.42	158.7	**7.6**

**Gold Equivalent based on a three-year trailing average price of $1,540/ounce gold and $30/ounce silver*

The Limestone sequence thins to the west in response to a rising ENE-verging antiform. The Main Ixtaca and Ixtaca North veins systems and the dykes transect the antiform sub-perpendicular to the strike of the fold axis. Vein density decreases within the shale units that core the antiform and mineralization is confined near the axis of the antiform within a west dipping tabular zone of low-grade mineralization having a true thickness ranging from 150 to 200m (Table 10-4 and Figure 10-3).

Mineralized limestone, shale and the cross-cutting dykes are unconformably overlain by bedded crystal tuff, which is also mineralized. Mineralization within tuff rocks overlying the Ixtaca Zone occurs as broad zones of alteration and disseminated sulphides having relatively few veins. High-grade zones of mineralization are locally present within the tuff vertically above the Main Ixtaca and Ixtaca North vein systems and dykes. The high-grade zones transition laterally into low grade mineralization, which together form a broad tabular zone of mineralization at the base of the tuff unit.

10.3 Chemalaco Zone

The Chemalaco Zone (also known as the Northeast Extension) of the Ixtaca deposit has an approximate strike length of 450m oriented roughly north-south (340 azimuth) and has been drilled via a series of ENE (070 degrees) oriented sections spaced at intervals of 25 to 50m, and near-surface oblique NNW-SSE oriented drillholes (Figure 10-1). The Chemalaco Zone dips moderately-steeply at 55 degrees WSW. High grade mineralization having a true-width ranging from less than 30 and up to 60m has been intersected beneath approximately 30m of tuff to a vertical depth of 550m, or approximately 700m down-dip. An additional sub-parallel zone has been defined underneath the Chemalaco having a true-width ranging from 5 to 40m and dipping 25 to 50 degrees to the WSW, resulting in a splayed zone extending from near-surface to a vertical depth of 250m. The sub-parallel zone has an approximate down-dip length up to 400m over a 250m strike length (Table 10-5,Figure 10-4).

The Chemalaco Zone vein lies northeast of the Main Ixtaca Zone and occurs within the hinge zone of a shale cored antiform. Near surface, along the axis of the antiform, a zone of structurally thinned, brecciated, and mineralized limestone is unconformably overlain by mineralized tuff rocks (Figure 10-4). At a vertical depth of 80m below surface, high-grade shale-hosted mineralization dips moderately-steeply at 25 to 55 degrees WSW sub-parallel to the interpreted axial plane of the antiform. The footwall of the high-grade zone is marked by a distinct 20 to 30m true-thickness felsic porphyry dyke (Chemalaco Dyke), which is also mineralized. The Chemalaco Dyke has been interested in multiple drillholes ranging from 250 to 550m vertically below surface, and its lower contact currently marks the base of Chemalaco Zone mineralization.

Table 10-5 Section 50+050N Significant Drill intercepts (Chemalaco Zone)

Hole ID	From (m)	To (m)	Interval (m)	Gold (g/t)	Silver (g/t)	AuEq* (g/t)
TU-12-190	85.00	89.00	4.00	0.25	0.5	0.3
TU-12-190	100.00	112.00	12.00	0.17	1.9	0.2
TU-12-190	259.00	272.90	13.90	0.17	12.3	0.4
TU-12-190	278.85	321.00	42.15	1.06	47.4	2.0
including	293.50	300.50	7.00	1.34	72.0	2.7
including	306.00	317.80	11.80	1.67	71.7	3.1
including	310.00	314.00	4.00	2.45	116.4	4.7
TU-12-190	377.90	386.00	8.10	0.24	2.8	0.3
TU-12-194	83.50	87.50	4.00	0.46	2.8	0.5
TU-12-194	112.60	124.00	11.40	0.22	4.4	0.3
TU-12-194	272.50	279.50	7.00	0.15	40.9	0.9
TU-12-194	294.50	300.00	5.50	0.14	81.1	1.7
TU-12-194	313.00	371.80	58.80	1.04	19.4	1.4
including	317.60	347.00	29.40	1.63	23.9	2.1
TU-12-199	66.00	70.00	4.00	0.26	2.4	0.3
TU-12-199	91.00	93.80	2.80	0.19	3.0	0.2
TU-12-199	344.20	424.00	79.80	0.84	20.6	1.2
including	365.70	385.70	20.00	1.19	25.6	1.7
including	396.50	402.50	6.00	1.43	16.0	1.7
including	408.30	423.40	15.10	1.48	37.6	2.2
including	414.30	416.10	1.80	4.90	175.5	8.3
TU-12-205	81.00	132.00	51.00	0.51	6.0	0.6
including	101.50	106.00	4.50	3.41	6.1	3.5
TU-12-205	254.50	293.50	39.00	0.61	88.8	2.3
including	255.50	281.20	25.70	0.86	127.8	3.3
including	256.00	272.40	16.40	1.08	164.8	4.3
including	256.00	265.00	9.00	1.57	244.5	6.3
TU-12-205	312.00	319.00	7.00	0.19	207.2	4.2
TU-13-265	488.40	531.80	43.40	0.50	9.2	0.7
including	500.60	507.20	6.60	2.15	11.6	2.4
including	504.20	507.20	3.00	3.36	17.1	3.7
TU-13-265	539.00	545.00	6.00	0.07	22.2	0.5
TU-13-265	550.30	558.00	7.70	0.07	28.1	0.6
TU-13-268	41.30	56.25	14.95	0.05	11.5	0.3
TU-13-268	61.25	120.50	59.25	0.11	41.1	0.9
including	74.90	79.75	4.85	0.25	126.9	2.7
including	103.00	106.00	3.00	0.23	81.2	1.8
TU-13-268	133.00	138.00	5.00	0.03	22.3	0.5
TU-13-268	151.50	208.00	56.50	0.36	42.0	1.2
including	166.00	178.50	12.50	0.56	91.4	2.3
including	166.00	167.50	1.50	0.74	223.7	5.1
including	192.00	199.50	7.50	0.75	51.6	1.8
TU-13-268	222.75	239.00	16.25	0.08	14.6	0.4
TU-13-272	48.00	138.50	90.50	0.20	31.4	0.8
including	66.05	70.20	4.15	0.44	49.5	1.4
including	77.50	84.80	7.30	0.29	71.1	1.7

Hole ID	From (m)	To (m)	Interval (m)	Gold (g/t)	Silver (g/t)	AuEq* (g/t)
including	112.75	119.75	7.00	0.43	40.1	1.2
including	129.00	138.50	9.50	0.41	114.0	2.6
TU-13-272	146.00	161.00	15.00	0.22	47.1	1.1
including	147.00	148.50	1.50	0.65	252.7	5.6
TU-13-272	187.00	193.50	6.50	0.11	11.5	0.3
TU-13-272	220.00	231.00	11.00	0.14	9.5	0.3
TU-13-275	68.50	84.00	15.50	0.15	10.6	0.4
TU-13-275	105.00	112.00	7.00	0.11	15.8	0.4
TU-13-275	120.00	134.50	14.50	0.18	6.2	0.3
TU-13-275	149.00	227.00	78.00	0.39	23.8	0.9
including	164.50	193.50	29.00	0.43	43.3	1.3
TU-13-275	254.00	258.00	4.00	0.01	13.5	0.3
TU-13-287	106.00	131.00	25.00	0.11	15.2	0.4
including	122.00	125.00	3.00	0.30	50.3	1.3
TU-13-287	156.50	182.00	25.50	0.66	102.3	2.7
including	168.00	170.08	2.08	4.35	975.0	23.3
TU-13-289	134.00	153.00	19.00	0.22	48.4	1.2
including	144.50	151.80	7.30	0.40	82.8	2.0
TU-13-289	160.00	188.00	28.00	0.21	10.8	0.4
TU-13-323	256.75	261.50	4.75	2.12	30.3	2.7
including	256.75	257.25	0.50	18.35	230.0	23.0
TU-13-323	271.00	358.50	87.50	1.07	56.3	2.2
including	282.00	289.00	7.00	0.33	126.0	2.9
including	282.00	283.50	1.50	0.60	276.3	6.1
including	297.25	338.75	41.50	1.94	81.5	3.6
including	298.00	312.50	14.50	3.00	184.3	6.7
including	319.00	325.50	6.50	2.28	37.7	3.0
TU-14-419	52.00	122.50	70.50	0.17	33.7	0.8
including	92.25	115.50	23.25	0.27	64.9	1.6
including	110.00	115.50	5.50	0.34	114.4	2.6
TU-14-419	131.00	168.00	37.00	0.37	70.4	1.8
including	161.75	165.00	3.25	2.50	420.8	10.9
TU-14-419	189.00	194.00	5.00	0.20	39.1	1.0
TU-14-420	52.40	102.00	49.60	0.27	21.1	0.7
including	81.00	89.50	8.50	0.85	54.1	1.9
TU-14-420	114.00	186.00	72.00	0.25	22.1	0.7
including	212.00	223.00	11.00	0.14	12.2	0.4

**Gold Equivalent based on a three-year trailing average price of $1,540/ounce gold and $30/ounce silver*

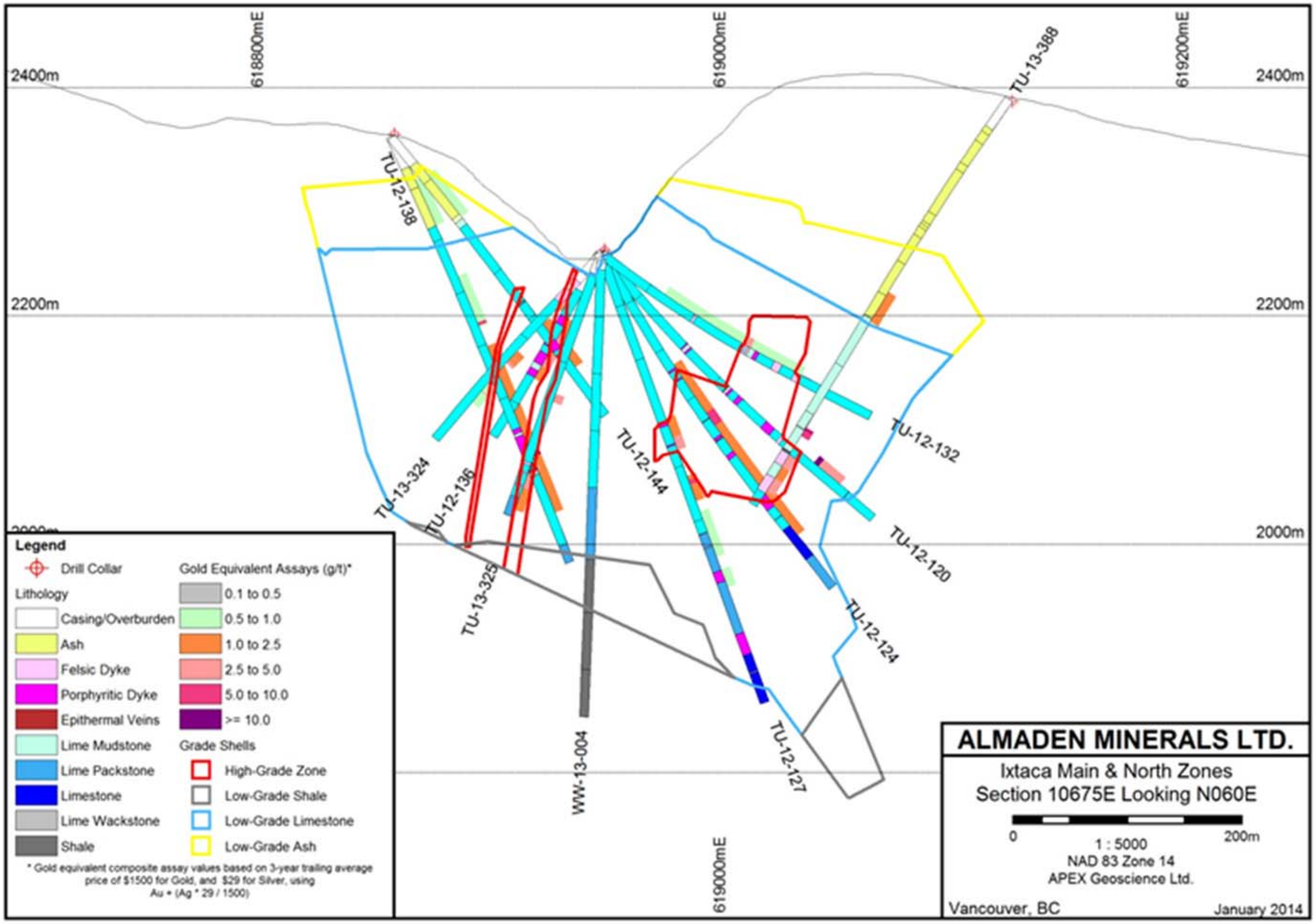


Figure 10-2 Section 10+675E through the Ixtaca Main and North Zones

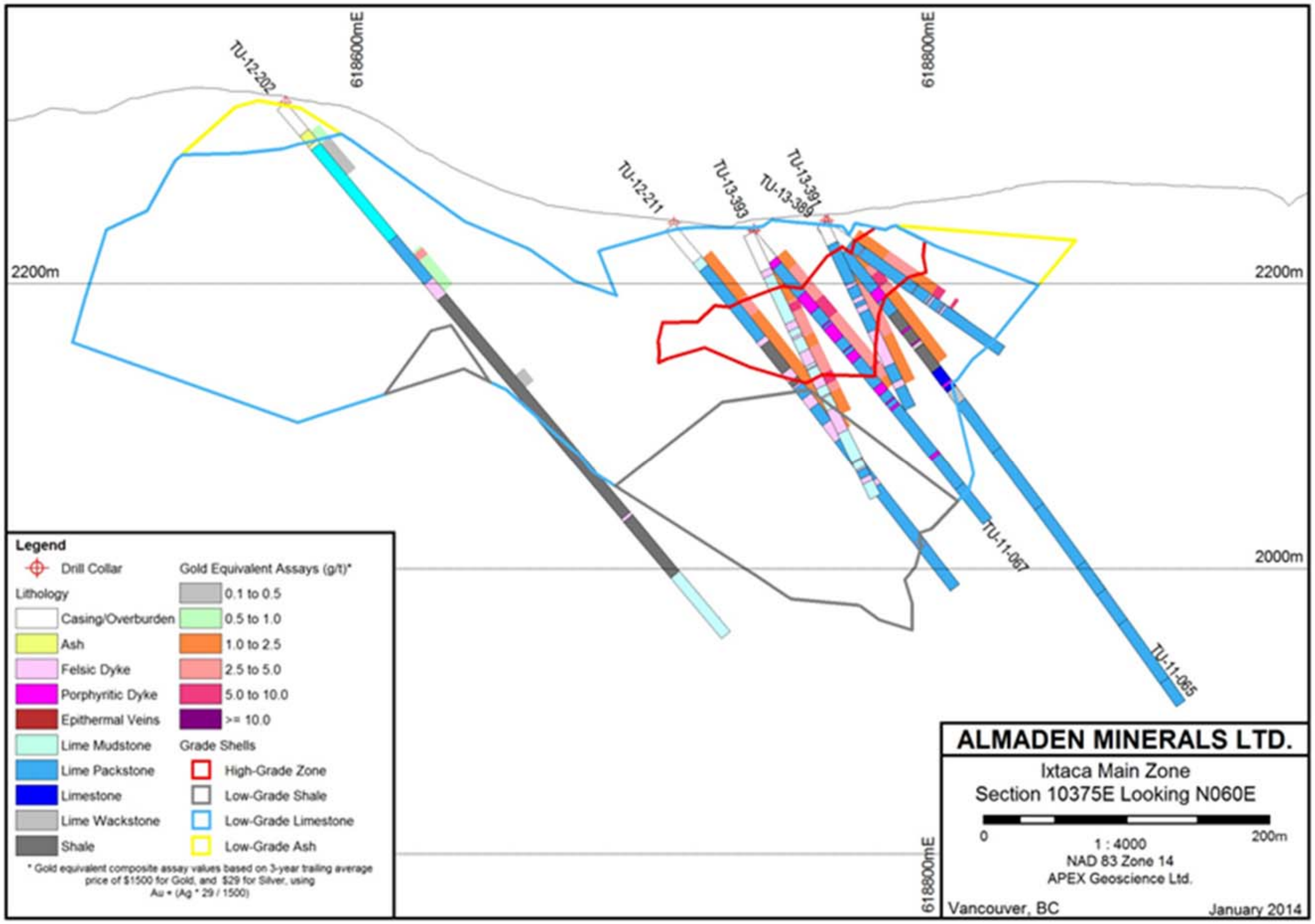


Figure 10-3 Section 10+375E through the Ixtaca Main Zone

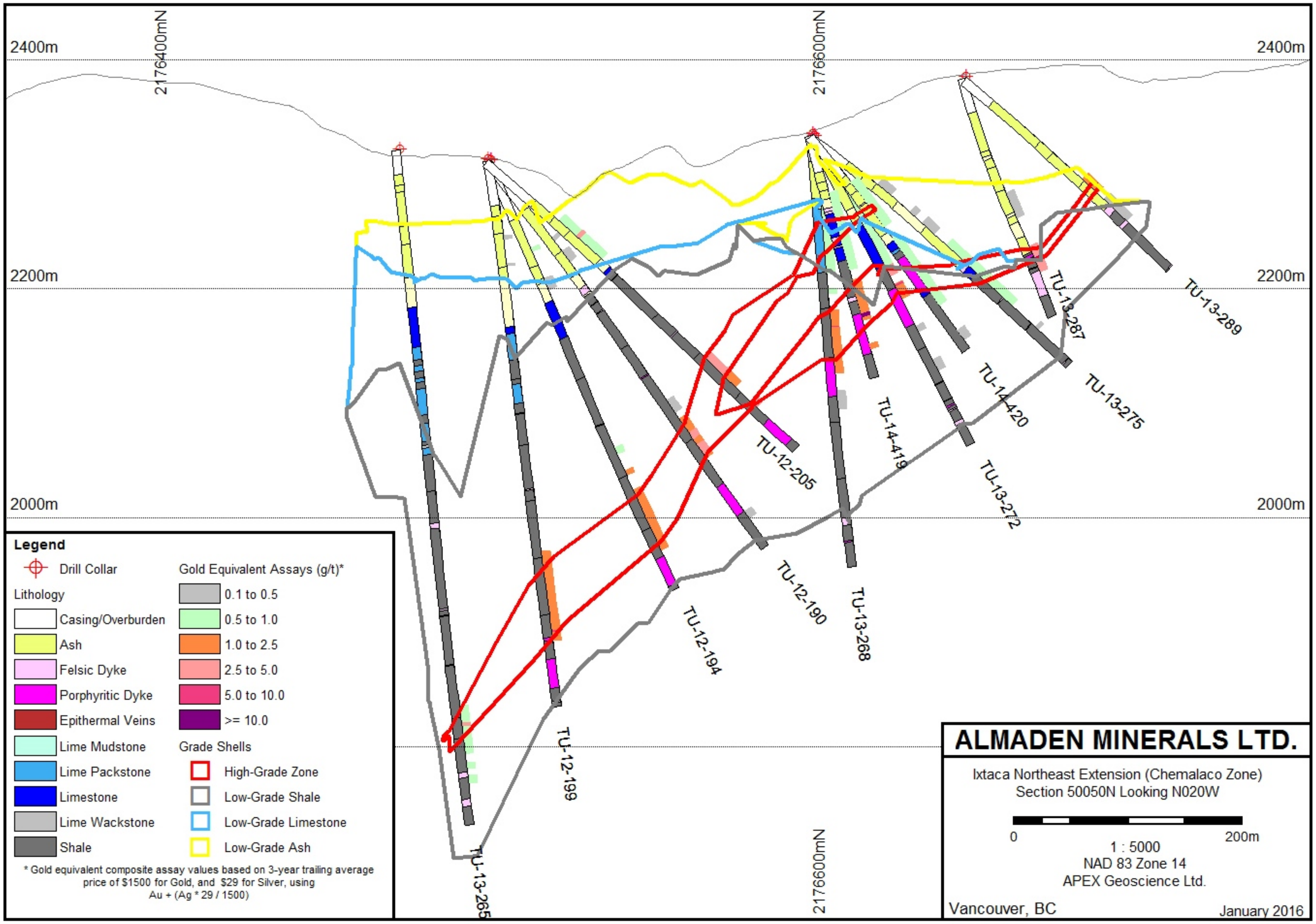


Figure 10-4 Section 50+050N through the Chemalaco Zone

11 SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 Sample Preparation and Analyses

11.1.1 Rock Grab and Soil Geochemical Samples

Rock grab and soil geochemical samples have been transported by Almaden field personnel to the Santa Maria core facility where they are placed in into sealed plastic twine (rice) sacks, sealed using single plastic cable ties. Custody of samples is handed over to ALS Minerals (ALS) at the Santa Maria core facility. ALS sends its own trucks to the Project to transport samples to its sample preparation facility in Guadalajara or Zacatecas, Mexico. Prepared sample pulps are then forwarded by ALS personnel to the ALS North Vancouver, British Columbia laboratory for analysis.

ALS is an International Standards Organization (ISO) 9001:2008 and ISO 17025-2005 certified geochemical analysis and assaying laboratory. ALS is independent of Almaden and the authors.

ALS reported nothing unusual with respect to the shipments, once received and Mr. Kristopher J. Raffle, P.Geo., has no reason to believe that the security of the samples has been compromised.

At the ALS Zacatecas and Guadalajara sample preparation facilities, rock grab samples are dried prior to preparation and then crushed to 10 mesh (70% minimum pass) using a jaw crusher. The samples are then split using a riffle splitter, and sample splits are further crushed to pass 200 mesh (85% minimum pass) using a ring mill pulverizer (ALS PREP-31 procedure). Soil samples are dried and sieved to 80mesh.

Rock grab samples are subject to gold determination via a 50 gram (g) fire-assay (FA) fusion utilizing atomic absorption spectroscopy (AA) finish with a lower detection limit of 0.005ppm Au (5 ppb) and upper limit of 10ppm Au (ALS method Au-AA24). A 50 gram (g) prepared sample is fused with a mixture of lead oxide, sodium carbonate, borax, silica and other reagents as required, inquarted with 6mg of gold-free silver and then cupelled to yield a precious metal bead. The bead is digested in 0.5ml dilute nitric acid and 0.5ml concentrated hydrochloric acid. The digested solution is cooled, diluted to a total volume of 4ml with de-mineralized water, and analyzed by atomic absorption spectroscopy against matrix-matched standards.

Soil samples are subject to gold determination via is digestion of a 50g prepared sample in a mixture of 3 parts hydrochloric acid and 1 part nitric acid (aqua regia). Dissolved gold is then determined by ICP-MS.

Silver, base metal and pathfinder elements for rock and soil samples are analyzed by 33-element inductively coupled plasma atomic emission spectroscopy (ICP-AES), with a 4-acid digestion (ALS method ME-ICP61). A 0.25g prepared sample is digested with perchloric, nitric, hydrofluoric and hydrochloric acids. The residue is topped up with dilute hydrochloric acid and the resulting solution is analyzed by ICP-AES. For rock samples only, following this analysis, the results are reviewed for high concentrations of bismuth, mercury, molybdenum, silver and tungsten and diluted accordingly. Samples meeting this criterion are then analyzed by inductively coupled plasma mass spectrometry (ICP-MS, ALS method ME-MS61). Results are corrected for spectral inter-element interferences. Four acid digestions are able to dissolve most minerals; however, depending on the sample matrix, not all elements are quantitatively extracted.

11.1.2 Almaden Drill Core

All strongly altered or epithermal-mineralized intervals of core have been sampled. Almaden employs a maximum sample length of 2 to 3m in unmineralized lithologies, and a maximum sample length of 1m in mineralized lithologies . During the years 2010 and 2011 Almaden employed a minimum sample length of 20cm. The minimum sample length was increased to 50cm from 2012 onwards to ensure the availability of sufficient material for replicate analysis. Sampling always begins at least five samples above the start of mineralization. Geological changes in the core such as major alteration or mineralization intensity (including large discrete veins), or lithology are used as sample breaks.

Drill core is half-sawn using industry standard gasoline engine-powered diamond core saws, with fresh water cooled blades and "core cradles" to ensure a straight cut. For each sample, the core logging geologist marks a cut line down the centre of the core designed to produce two halves of equal proportions of mineralization. This is accomplished by marking the cut line down the long axis of ellipses described by the intersection of the veins with the core circumference.

Areas of very soft rock (e.g. fault gouge), are cut with a machete using the side of the core channel to ensure a straight cut. Areas of very broken core (pieces <1cm) are sampled using spoons. In all cases, the right hand side of the core (looking down the hole) is sampled. After cutting, half the core is placed in a new plastic sample bag and half is placed back in the core box. Between each sample, the core saw and sampling areas are washed to ensure no contamination between samples. Field duplicate, blank and analytical standards are added into the sample sequence as they are being cut.

Sample numbers are written on the outside of the sample bags twice and the numbered tag from the ALS sample book is placed inside the bag with the half core. Sample bags are sealed using single plastic cable-ties. Sample numbers are checked against the numbers on the core box and the sample book.

Drill core samples collected by the Almaden are placed into plastic twine (rice) sacks, sealed using single plastic cable ties. ALS sends its own trucks to the Project to take custody of the samples at the Santa Maria core facility and transport them to its sample preparation facility in Guadalajara or Zacatecas, Mexico. Prepared sample pulps are then forwarded by ALS personnel to the ALS North Vancouver, British Columbia laboratory for analysis.

Drill core samples are subject to gold determination via a 50 gram (g) AA finish FA fusion with a lower detection limit of 0.005ppm Au (5ppb) and upper limit of 10ppm Au (ALS method Au-AA24). A 50g prepared sample is fused with a flux mixture, inquarted with 6mg of gold-free silver and then cupelled to yield a precious metal bead. The bead is digested in 0.5ml dilute nitric acid and 0.5ml concentrated hydrochloric acid. The digested solution is cooled, diluted to a total volume of 4ml with de-mineralized water, and analyzed by atomic absorption spectroscopy against matrix-matched standards.

Over limit gold values (>10ppm Au) are subject to gravimetric analysis, whereby a 50g prepared sample is fused with a mixture of lead oxide, sodium carbonate, borax, silica and other reagents in order to produce a lead button. The lead button containing the precious metals is cupelled to remove the lead. The remaining gold and silver bead is parted in dilute nitric acid, annealed and weighed as gold (ALS method Au-GRA22).

Silver, base metal and pathfinder elements for drill core samples have been analyzed by 33- element ICP-AES, with a 4-acid digestion, a lower detection limit of 0.5ppm Ag and upper detection limit of 100ppm Ag (ALS method ME-ICP61). A 0.25g prepared sample is digested with perchloric, nitric, hydrofluoric and hydrochloric acids. The residue is topped up with dilute hydrochloric acid and the resulting solution is analyzed by ICP-AES (ALS method ME-ICP61). Four acid digestions are able to dissolve most minerals; however, depending on the sample matrix, not all elements are quantitatively extracted.

Over limit silver values (>100ppm Ag) have been subject to 4-acid digestion ICP-AES analysis with an upper limit of 1,500ppm Ag (ALS method ME-OG62). A prepared sample is digested with nitric, perchloric, hydrofluoric, and hydrochloric acids, and then evaporated to incipient dryness. Hydrochloric acid and de-ionized water is added for further digestion, and the sample is heated for an additional allotted time. The sample is cooled and transferred to a 100ml volumetric flask. The resulting solution is diluted to volume with de-ionized water, homogenized and the solution is analyzed by ICP-AES. Ultra-high grade silver values (>1,500ppm Ag) are subject to gravimetric analysis with an upper detection limit of 10,000ppm Ag (Ag-GRA22).

11.1.3 Author's Drill Core

The collected drill core samples have been placed into sealed plastic bags and transported by Mr. Kristopher J. Raffle, P.Geo., (considered "the author" in this Section of the report) to ALS North Vancouver, British Columbia laboratory for gold FA and ICP-MS analysis. The author did not have control over the samples at all times during transport; however the author has no reason to believe that the security of the samples has been compromised.

The samples are dried prior to preparation and then crushed to 10mesh (70% minimum pass) using a jaw crusher. The samples are then split using a riffle splitter, and sample splits are further crushed to pass 200mesh (85% minimum pass) using a ring mill pulverizer (ALS PREP-31 procedure).

Drill core samples collected by Kristopher J. Raffle, P.Geo., have been subject to gold determination via a 50 gram (g) AA finish FA fusion with a lower detection limit of 0.005ppm Au (5ppb) and upper limit of 10ppm Au (ALS method Au-AA24). A 50g prepared sample is fused with a flux mixture, inquarted with 6mg of gold-free silver and then cupelled to yield a precious metal bead. The bead is digested in 0.5mL dilute nitric acid and 0.5mL concentrated hydrochloric acid. The digested solution is cooled, diluted to a total volume of 4mL with de-mineralized water, and analyzed by atomic absorption spectroscopy against matrix-matched standards.

Silver, base metal and pathfinder elements for rock and soil samples are analyzed by 33-element inductively coupled plasma atomic emission spectroscopy (ICP-AES), with a 4-acid digestion. A 0.25g prepared sample is digested with perchloric, nitric, hydrofluoric and hydrochloric acids. The residue is topped up with dilute hydrochloric acid and the resulting solution is analyzed by ICP-AES. Following this analysis, the results are reviewed for high concentrations of bismuth, mercury, molybdenum, silver and tungsten and diluted accordingly. Samples meeting this criterion are then analyzed by inductively coupled plasma mass spectrometry (ICP-MS, ALS method ME-MS61). Results are corrected for spectral inter-element interferences. Four acid digestions are able to dissolve most minerals; however, depending on the sample matrix, not all elements are quantitatively extracted.

Over limit silver values (>100ppm Ag) are subject to 4-acid digestion, ICP-AES analysis with an upper limit of 1,500ppm Ag (ALS method ME-OG62). A prepared sample is digested with nitric, perchloric, hydrofluoric, and hydrochloric acids, and then evaporated to incipient dryness. Hydrochloric acid and de-ionized water is added for further digestion, and the sample is heated for an additional allotted time. The sample is cooled and transferred to a 100ml volumetric flask. The resulting solution is diluted to volume with de-ionized water, homogenized and the solution is analyzed by ICP-AES.

11.2 Quality Assurance / Quality Control Procedures

For the Tuligtic rock grab sample and soil geochemical programs, Almaden relies on external quality assurance and quality control (QA/QC) measures employed by ALS. QA/QC measures at ALS include routine screen tests to verify crushing efficiency, sample preparation duplicates (every 50 samples), and analytical quality controls (blanks, standards, and duplicates). QC samples are inserted with each analytical run, with the minimum number of QC samples dependant on the rack size specific to the chosen analytical method. Results for quality control samples that fall beyond the established limits are automatically red-flagged for serious failures and yellow-flagged for borderline results. Every batch of samples is subject to a dual approval and review process, both by the individual analyst and the Department Manager, before final approval and certification. The author has no reason to believe that there are any issues or problems with the preparation or analyzing procedures utilized by ALS.

Drill core samples are subject to Almaden's internal QA/QC program that includes the insertion of analytical standard, blank and duplicate samples into the sample stream. A total of 15 QA/QC samples are present in every 100 samples sent to the laboratory.

QA/QC sample results are reviewed following receipt of each analytical batch. QA/QC samples falling outside established limits are flagged and subject to review and possibly re-analysis, along with the 10 preceding and succeeding samples (prior to August 7, 2012, a total of five samples preceding and five samples succeeding the reviewable QA/QC sample have been re-analyzed). Where the re-analyses fall within acceptable QA/QC limits the values are added to the drill core assay database. Summary results of Almaden's internal QA/QC procedures are presented below.

In Mr. Raffle's opinion, Almaden's QA/QC procedures are reasonable for this type of deposit and the current level of exploration. A total of 14,731 QA/QC analytical standard, blank and duplicate samples have been submitted for analysis. Based on the results of the QA/QC sampling summarized below, the analytical data is considered to be accurate; the analytical sampling is considered to be representative of the drill sample, and the analytical data to be free from contamination. The analytical data is suitable for inclusion into a mineral Resource Estimate.

11.2.1 Analytical Standards

A total of 19 different analytical standards have been used on the Project. Since November 13, 2012 and drillhole TU-12-221 (the end of the Maiden Resource Estimate cut-off), 9 different analytical standards have been used and are the basis for the section herein. Please refer to the 2013 Almaden NI 43-101 (Raffle et al. 2013) report for a detailed discussion of the previously used standards.

Each standard has an accepted gold and silver concentration as well as known "between laboratory" standard deviations, or expected variability, associated with each standard. The standards include seven multi-element gold-silver standards with accepted values ranging from 0.564 to 3.88g/t Au, and 14.4 to 152.0g/t Ag. One analytical standard for every 20 samples (5%) is inserted into the sample stream at the '05', '25', '45', '65' and '85' positions. QA/QC summary charts showing gold and silver values for each analytical standard in addition to the accepted value, the second, and third "between laboratory" standard deviation are shown in Figure 11-1 below.

Between 2010 and 2013 Almaden employed two separate criteria by which standards have been assigned "pass" or "reviewable" status.

Up to drillhole TU-12-130 a reviewable standard had been defined as any standard occurring within a reported mineralized interval returning greater than three (3) standard deviations (3SD) above the accepted value for gold or silver. Beginning with drillhole TU-12-131, a reviewable standard is now defined as any standard occurring anywhere in a drillhole returning >3SD above or below the accepted value for gold or silver. In addition, two standards analyzed consecutively returning values >2SD above or below the accepted value for the same element (gold or silver) are classified as reviewable.

All standard samples returning gold or silver values outside the established criteria are reviewed. A decision to conduct reanalysis of samples surrounding the reviewable standard is based on whether the standard returned a value above or below the accepted value (low, or slightly high >3SD values are allowed after data review) or if it occurred within a reported interval (>3SD values are allowed outside of reported intervals) Prior to August 7, 2012, when a reviewable standard has been recognized the five preceding and five succeeding samples, in addition to the standard have been subject to review and possibly re-analysis. After August 7, 2012 when a reviewable standard is recognized, the ten preceding and ten succeeding samples, in addition to the standard is subject to review and possibly re-analysis. The results of re-analysis are then compared to the original analysis. Provided that no significant systematic increase or decrease in gold and silver values is noted and the re-analyzed standard returned values within the expected limits, the QA/QC concern is considered resolved and the re-analyzed standard value and surrounding reanalyzed samples are added to the drillhole database.

A total of 6,846 analytical standards have been inserted into the sample stream of 116,907 assays for gold and silver for the 475 drillholes. Of the 6,846 standards, a total of 2,356 have been subject to review criteria in place up to drillhole TU-12-130. Of the remaining 4,490 samples subject to the current review criteria (TU-12-131 and later), 1,708 samples have been included in the maiden mineral Resource Estimate up to hole TU-12-221 (Raffle et al., 2013). QA/QC results with respect to the remaining 2,782 standards are reported herein (TU-12-222 and later).

Of the 2,782 QA/QC samples inserted into the sample stream since November 13, 2012, a total of 174 (6.2%) have been initially reviewable as a result of two consecutive standards returning >2SD from the accepted value, or a single standard returning >3SD from the accepted value for gold or silver. These standards have been re-analysed and all but four passed the repeat analysis (Figure 11-1). Of the four (4) re-analysis failures, one (1) has been outside the reported mineralized interval, and the remaining three (3) assayed within the accepted value for Au but failed the accepted value for Ag. Of these three re-analysis failures, two have been consecutive standards that returned >2SD from the accepted Ag value and one re-assayed >3SD for the accepted Ag value.

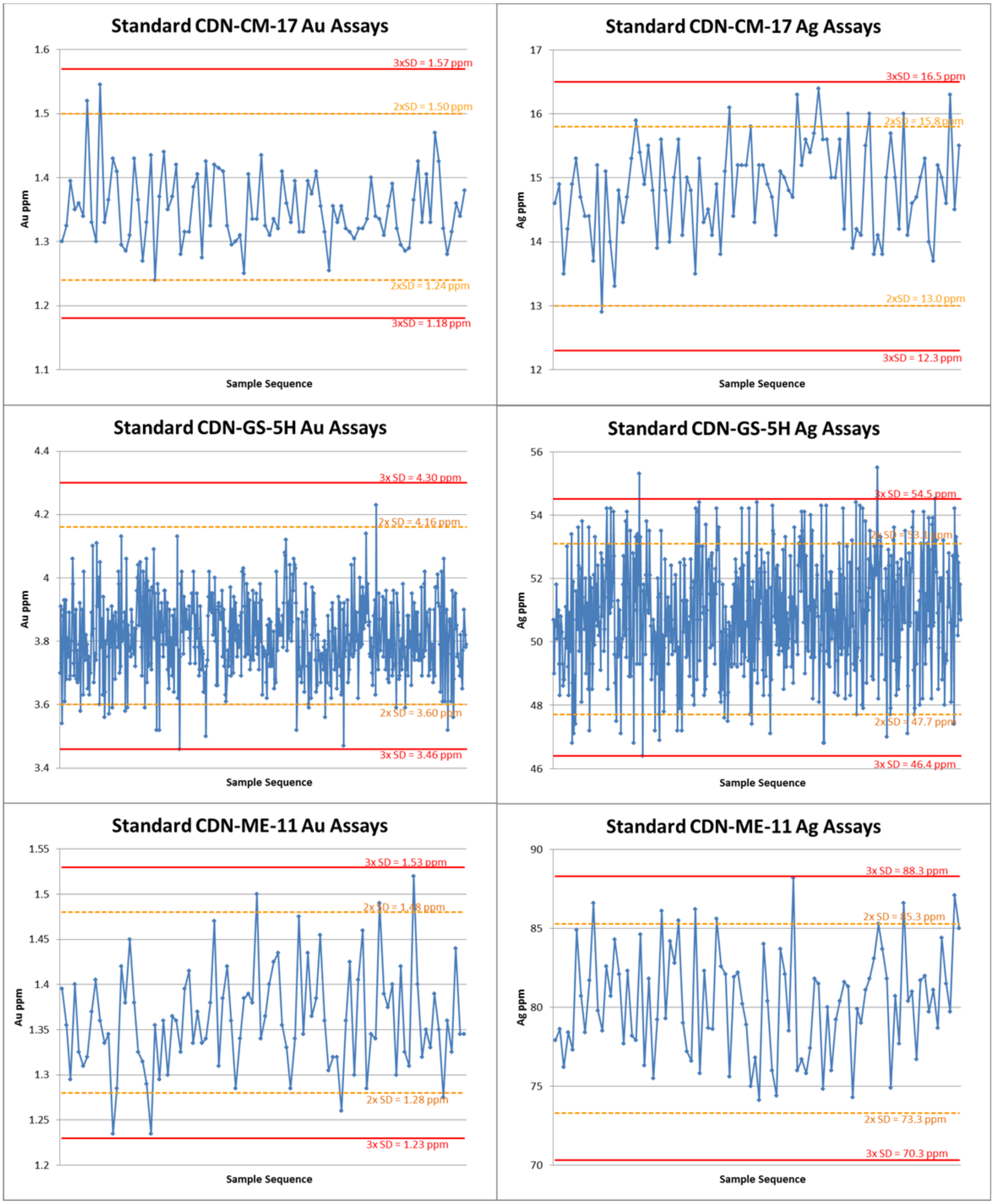


Figure 11-1 QA/QC Analytical Standards

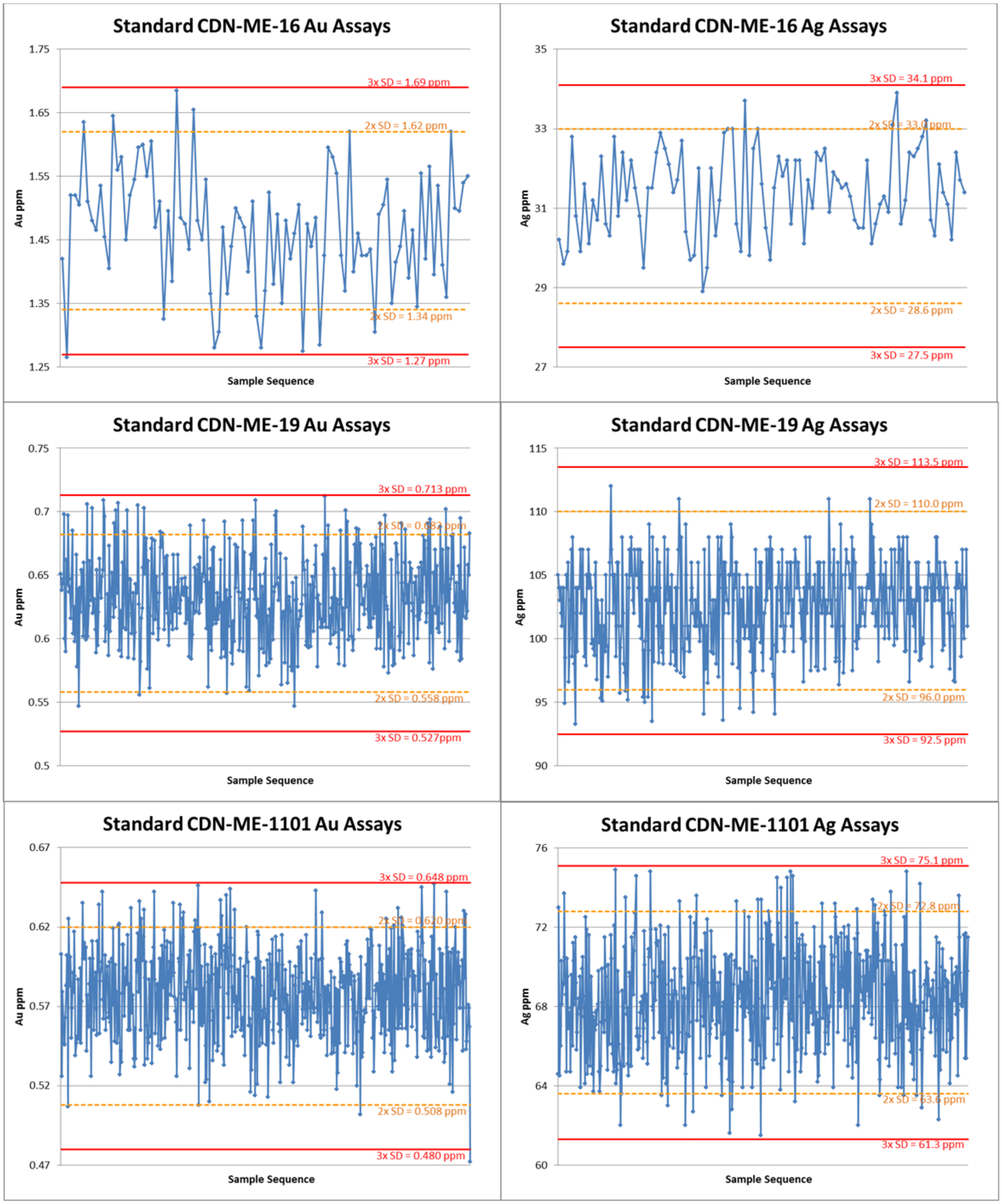


Figure 11-1 QA/QC Analytical Standards cont…

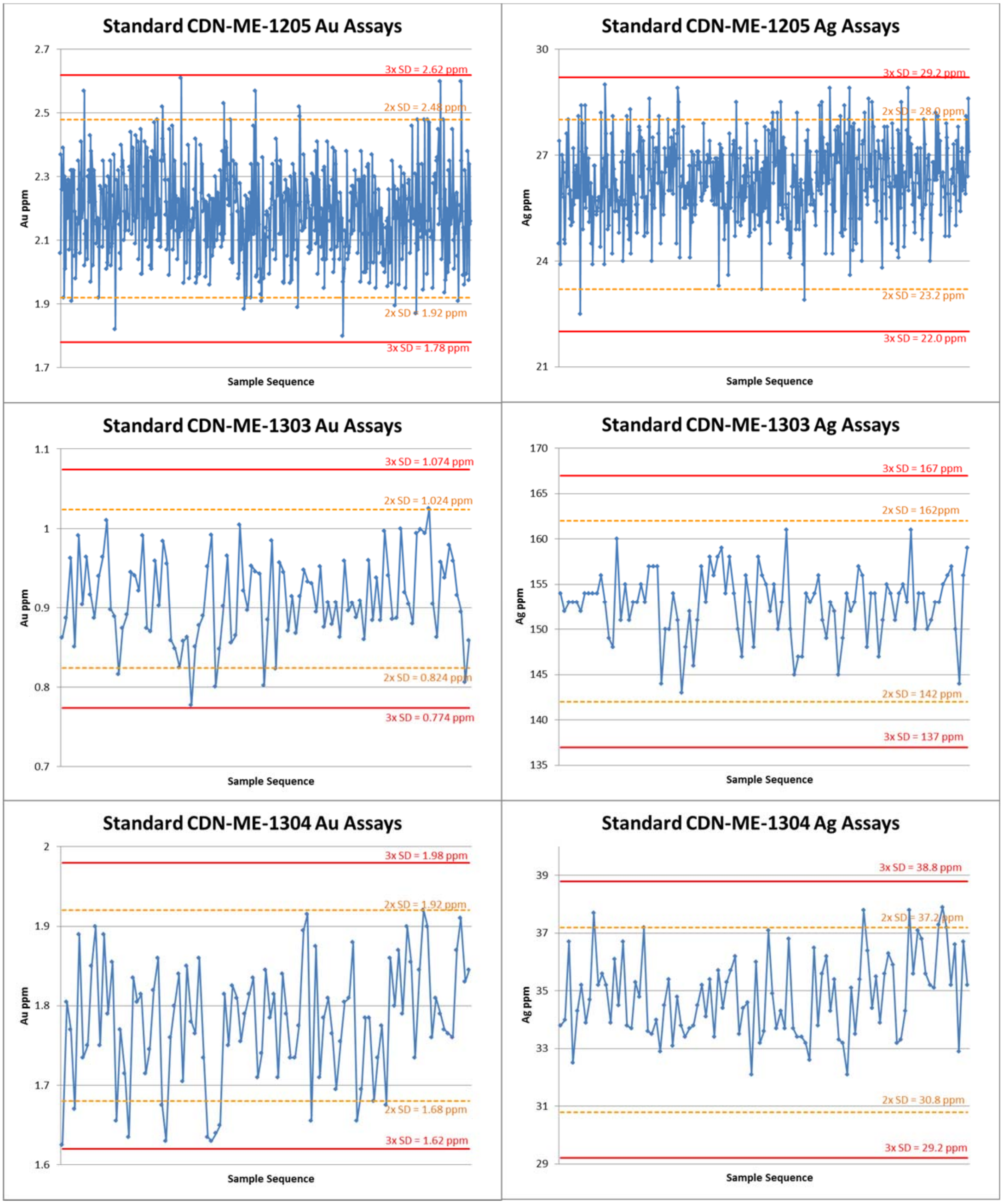


Figure 11-1 QA/QC Analytical Standards cont…

11.2.2 Blanks

Local limestone gravel is used for coarse "blank" samples to monitor potential contamination during the sample preparation procedure. One blank for every 20 samples (5%) is inserted into the sample stream at the '10', '30', '50', '70', and '90' positions. Blank samples returning values of greater than 50ppb Au and/or 5ppm Ag are flagged for review.

Prior to August 7, 2012, reviewable blank samples occurring outside a reported mineralized intercept have not been subject to re-analysis. In the event that a blank returned values above the accepted limits for gold or silver (prior to August 7, 2012), the blank and five samples on either side have been re-analyzed. To provide additional confidence, on August 7, 2012, Almaden increased the number of samples re-analyzed to ten samples on either side of the blank in question. The results of re-analysis are then compared to the original analysis. Provided that no significant systematic increase or decrease in gold and silver values is noted and the re-analyzed blank does not return values above the accepted limits; the QA/QC concern is considered resolved and the re-analyzed blank value and surrounding reanalyzed samples are added to the drillhole database.

Of the 2,784 blank samples analyzed since November 13, 2012, a total of nine blanks have returned assays greater than the accepted values of 50ppb Au and 5ppm Ag. Of these, eight blanks have returned greater than 50ppb Au, and seven blanks returned greater than 5ppm Ag. These blanks occurred within mineralized intervals, and as such have been re-assayed. When re-assayed, all blanks except one sample returned values below the accepted values for Au and Ag (Figure 11-2). The single remaining failed blank sample immediately follows a high grade sample that returned an assay of 5,310ppm Ag and in this case it is reasonable that a certain amount of carryover occurred.

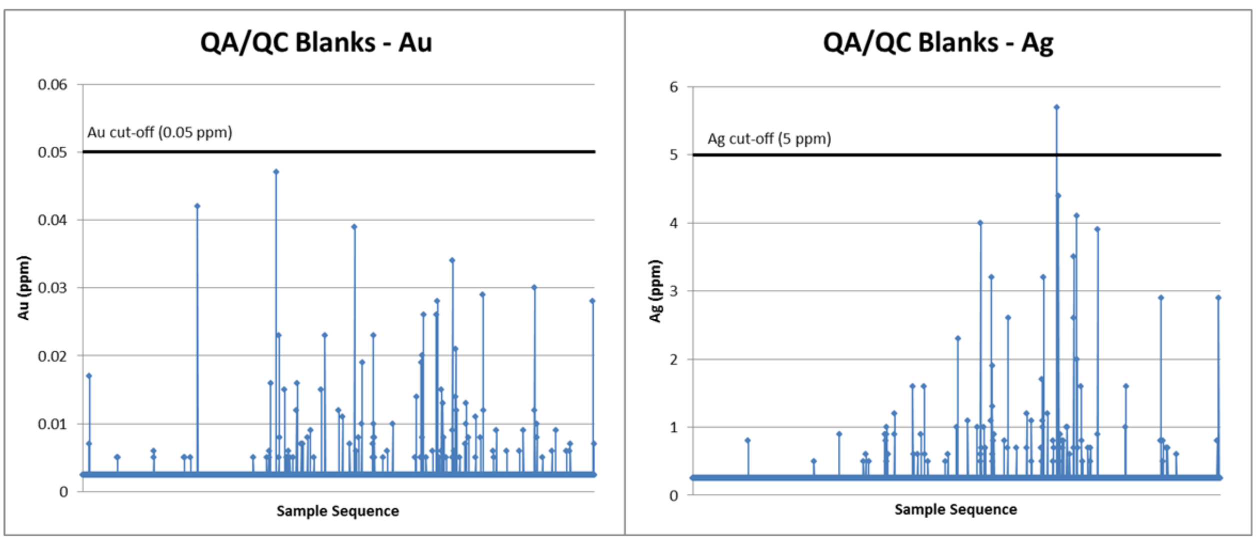


Figure 11-2 QA/QC Blanks

11.2.3 Duplicates

Quartered-core duplicate samples are collected to assess the overall repeatability of individual analytical values. One core duplicate for every 20 samples (5%) is inserted into the sample stream at the '15', '35', '55', '75', and '95' positions. A total of 2,758 quarter-core duplicates have been inserted into the sample stream beginning with drillhole TU-12-222.

As part of their internal QA/QC program, ALS completes routine re-analysis of prep (coarse reject) and pulp duplicates to monitor precision. ALS analyzed a total of 892 prep duplicates for gold, and 918 for silver. A total of 2,142 pulp duplicates have been analyzed for gold and 1,679 for silver.

Charts showing original versus duplicate quarter-core, prep, and pulp duplicate values for gold and silver show a significant and progressive increase in sample repeatability (Figure 11-3). Increased repeatability is expected as the level of duplicate sample homogenization increases from low (quarter-core) to moderate (prep) and high (pulp). The data indicates a high level of repeatability for both prep (coarse reject) and pulp duplicates. This is interpreted to indicate a low "nugget" effect with respect to Ixtaca gold and silver analyses. Excluding primary geologic heterogeneity (quarter-core), the data show a homogenous distribution of gold and silver values within Ixtaca drill core.

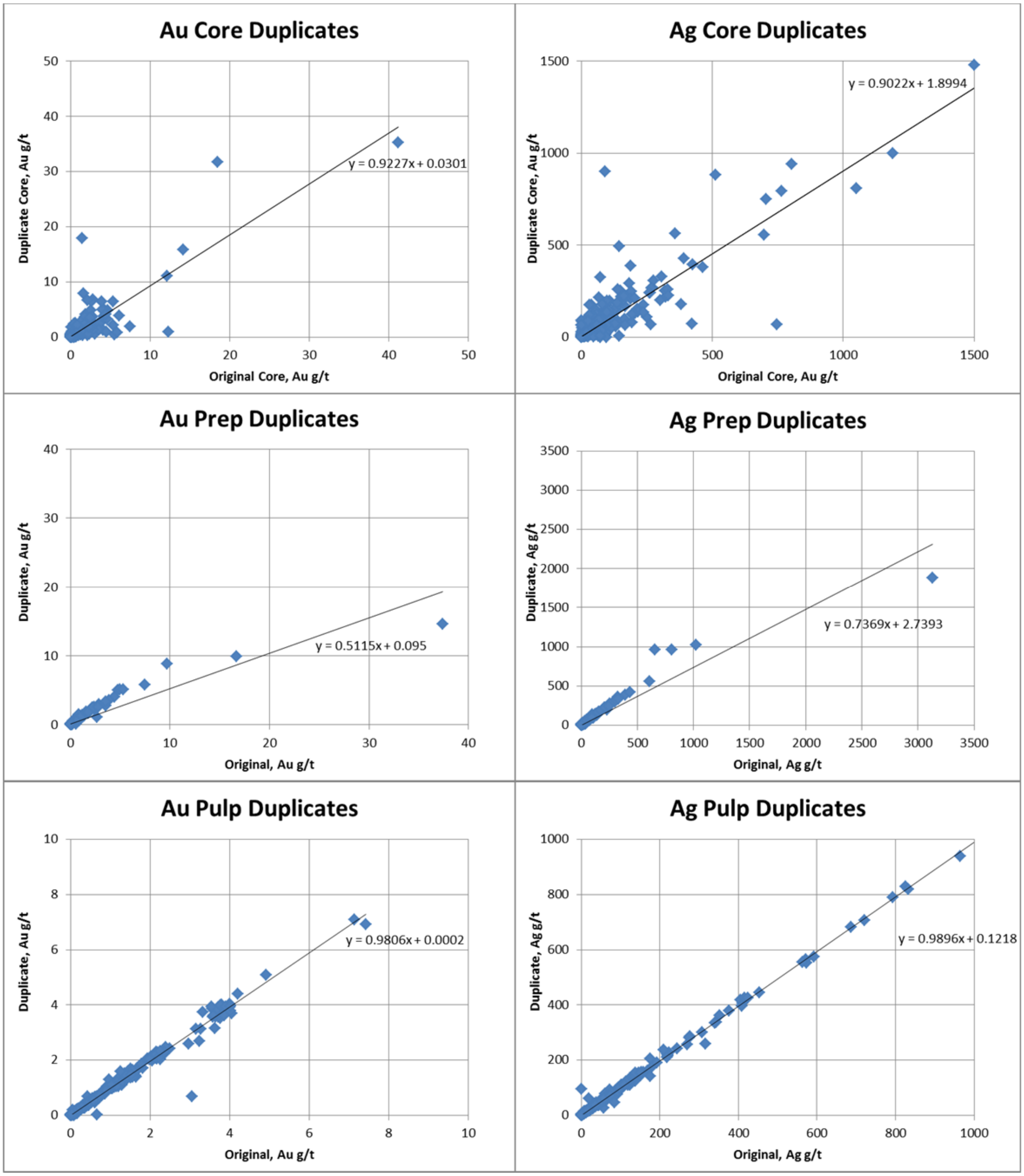


Figure 11-3 QA/QC Duplicates

11.3 Independent Audit of Almaden Drillhole Database

Between August 23 and September 26, 2012 and subsequently January 2 and January 21, 2014 APEX personnel, under the direct supervision of Kristopher J. Raffle, P.Geo., conducted an independent audit of Almaden's drillhole database. The audit included systematic checks of database values for drill collar coordinate, downhole survey, and drill core, analytical standard, duplicate, and blank sample assays against the original field survey files and laboratory certificates. In addition, APEX conducted a review of the Almaden QA/QC database, summary results of which is presented within Section 11.2 above.

11.3.1 Collar Coordinate and Downhole Survey Databases

A total of 22 diamond drillhole collar locations have been confirmed by Kristopher J. Raffle, P.Geo., following site visits to the Tuligtic Property on October 18, 2011, September 23, 2012 and November 20, 2013. The drill locations have been compared with the Almaden database used in the mineral Resource Estimate and are deemed to be accurate. In addition, Almaden has provided APEX with copies of all original down hole survey field records. Original field records for a total of 42 drillholes have been checked against database values used for the mineral Resource Estimate. No discrepancies have been found.

11.3.2 Drill Core Assay Database

A total of 116,907 drill core samples exist within the drill database (475 drillholes in total). The database audit consisted of checking 10,885 database gold and silver values against the original ALS analytical certificates. The audit specifically focused on assays within reported mineralized intercepts. No discrepancies have been identified between the original ALS analytical certificates and Almaden's drillhole database values.

12 DATA VERIFICATION

Kristopher J. Raffle, P.Geo., (considered "the author" in this Section of the report) conducted a reconnaissance of the Tuligtic Property from October 17 to October 20, 2011 to verify the reported exploration results. The author completed a traverse of the Ixtaca Zone, observed the progress of ongoing diamond drilling operations and recorded the location of select drill collars consistent with those reported by Almaden. Additionally, Almaden's complete drill core library has been made available and the author reviewed mineralized intercepts in drill core from a series of holes across the Ixtaca Zone. The author personally collected quartered drill core samples as 'replicate' samples from select reported mineralized intercepts.

Additional visits to the Tuligtic Property were carried out by the author on September 23, 2012 and November 20, 2013 to observe current operations, review additional mineralized intercepts in drill core, and collect quarter drill core samples from the recently completed drillholes. A comparison of the results of the author's 'replicate' sampling versus original Almaden reported values for gold and silver are presented in Table 12-1.

Table 12-1 Authors Independent Drill Core Sample Assays

Authors Sample	Almaden Sample	Drillhole	From (m)	To (m)	Interval (m)	Authors Au (ppm)	Authors Ag (ppm)	Almaden Au (ppm)	Almaden Ag (ppm)
11KRP201	51662	TU-11-036	82.97	83.5	0.53	7.85	525	5.59	504
11KRP202	4596	TU-10-006	332.62	333.66	1.04	3.00	164	2.79	191
11KRP203	45073	TU-11-020	190.57	190.87	0.30	5.49	271	5.19	285
11KRP204	56217	TU-11-051	91.70	92.20	0.50	1.98	229	4.04	349
11KRP205	46586	TU-11-034	140.16	140.50	0.34	32.40	691	29.9	712
11KRP206	45347	TU-11-021	168.67	169.16	0.49	17.60	1130	15.55	1460
12KRP601	086459	TU-12-138	299.50	300.00	0.50	1.745	307	1.545	229
12KRP602	094696	TU-12-164	188.00	188.50	0.50	0.819	126	1.745	134
12KRP603	N298311	TU-12-123	228.60	229.10	0.50	3.45	86.6	4.39	92.5
12KRP604	N296249	TU-12-124	174.80	175.30	0.50	1.165	100	2.01	155
12KRP605	098391	TU-12-166	356.40	357.00	0.60	3.94	13.2	3.64	14.5
12KRP606	071443	TU-12-103	273.50	274.00	0.50	5.20	118	4.36	136
13KRP201	126912	TU-13-238	216.00	216.50	0.50	3.78	92	2.69	63.4
13KRP202	142029	TU-13-287	166.98	168.00	1.02	0.668	48	0.775	87.7
13KRP203	141281	TU-13-308	375.50	376.00	0.50	2.36	19	2.41	33.2
13KRP204	143281	TU-13-309	195.00	195.50	0.50	11.35	756	14.4	1000

Based on the results of the traverses, drill core review, and 'replicate' sampling Mr. Raffle has no reason to doubt the reported exploration results. Slight variation in assays is expected due to variable distribution of mill feed minerals within a core section but the analytical data is considered to be representative of the drill samples and suitable for inclusion in the Resource Estimate.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

The metallurgical development for Ixtaca project started in 2012 with Almaden Minerals shipping samples for exploratory metallurgical testing at Blue Coast Research's laboratory located in Parksville, British Columbia. Almaden completed a total of ten scoping level tests on four different composite samples, Limestone, Volcanic, High Grade Limestone-Dyke, and Black Shale, all of them generally representing the spatially known mineralized deposit at the time. A follow-up scoping level testing program was completed in September 2013 using the same original four composite samples also at Blue Coast. This testing program was completed in May 2014, and totalled 74 tests including gravity concentration, flotation, and leaching, with its results presented in the Preliminary Economic Assessment Report filed on 09 October 2014 (amended 06 November 2015).

Fresh drill core samples collected by Almaden in the May 2014 to June 2015 period have been used in an new ongoing metallurgical testing campaign at McClelland Laboratories Inc. in Reno, Nevada. This metallurgical program has been conducted on samples representing the major Ixtaca lithology types, and as of November 2015 the program has included a total of 11 gravity concentration tests, 109 flotation tests, 63 leaching tests, and electronic microscopy (Qemscan) at Bureau Veritas Minerals Laboratory in Vancouver, British Columbia.

A parallel, exploratory coarse gravity concentration testwork campaign was conducted on fresh core sample of Limestone at Gekko Systems Pty in Ballarat, Victoria, Australia. This testwork program was executed between August-December 2015 and explored the potential of using a Gekko's inline pressure jig machine.

The location of diamond drill holes used to source the metallurgical samples for all the metallurgical test work programs are presented in Figure 13-1.

Limestone ore type forms the vast majority of the Ixtaca PEA Update mill feed, followed by a small portion of Volcanic ore type and a minor volume of Black Shale ore type. (see Table 13-1). This is consistent with the previous Ixtaca PEAmine plans which had a significantly larger pit limit than the PEA Update mine plan.

Table 13-1: Ixtaca PEA Update Mill Feed Composition by Ore Type

Ore Type	Million Tonnes	Weight Proportion
Limestone	31.1	87.9%
Volcanic	3.8	10.7%
Black Shale	0.5	1.4%
Total LOM	**35.4**	**100%**

This section focuses on the results from the latest testing carried out during 2015 on fresh drill core samples. Note that the metallurgical testing program is intended to continuing in 2016 with a focus on optimizing the metallurgical performance achieved so far.

13.1 Diamond Drill Holes Location

Figure 13-1 shows location of the diamond drillhole collars (and its trace projection) used to provide samples for metallurgical testing. Metallurgical drillholes samples have been collected inside the Ixtaca mineable pit boundary and are adequately distributed throughout the Ixtaca deposit.

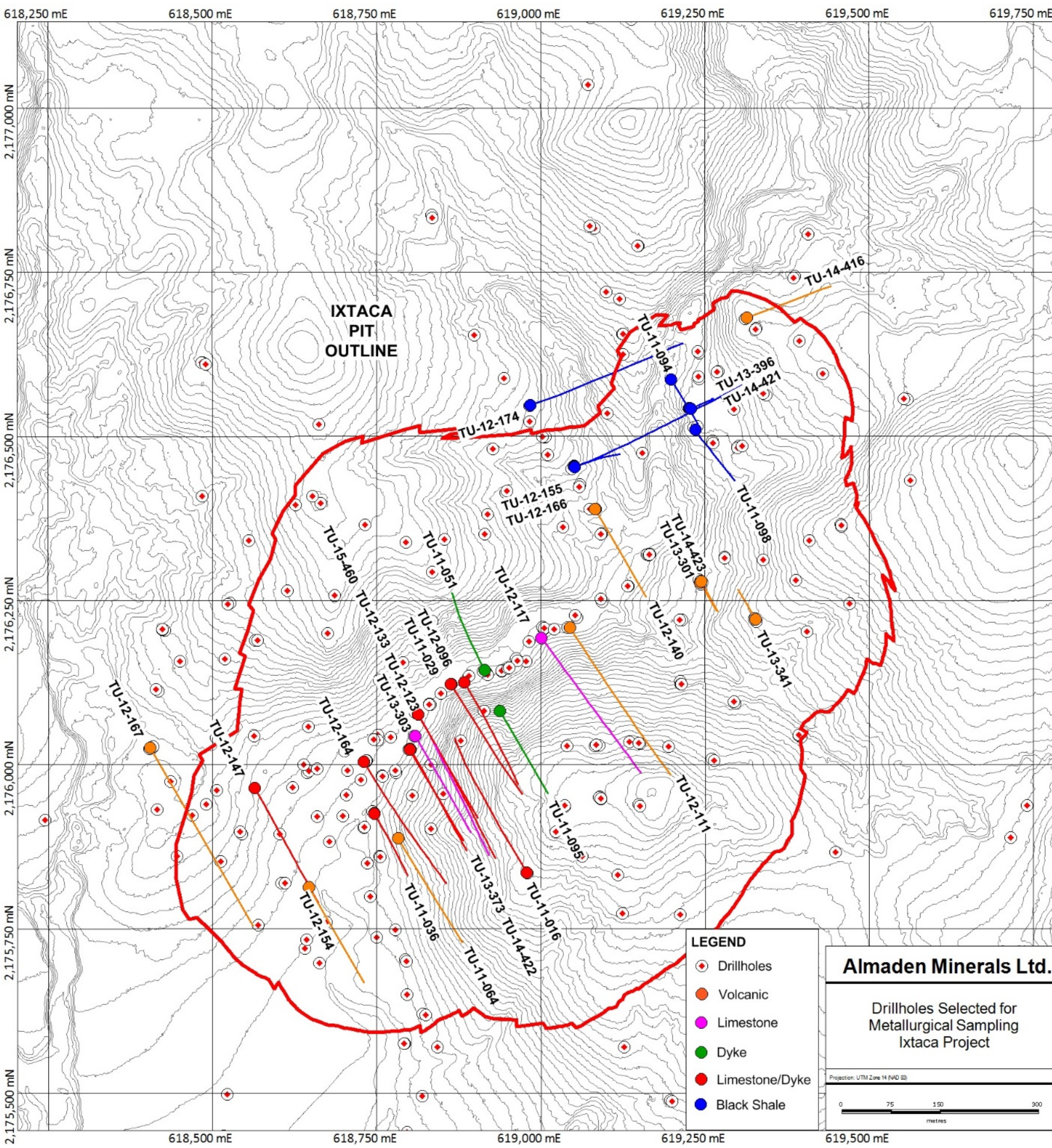


Figure 13-1: Metallurgical Sample Locations

13.2 Characterization of the Metallurgical Domains

Ixtaca economic mineralization is hosted by three primary geologic units; limestone, volcanic and black shale. Each unit has been crosscut by later mineralization. The limestone and black shale basement units are overlain by the later volcanic unit. The limestone and black shale units are folded and the overlying volcanic is more flat-lying so that in the deposit area both the limestone and black shale units are locally in contact with the volcanic. The limestone and black shale are calcareous mudstone and siltstone units respectively. The limestone unit is thickly bedded and the black shale unit is generally thinly bedded. Dykes crosscut the limestone and black shale units but not the volcanic. Minor conglomerate material comprised of volcanic and basement rock fragments occurs sporadically between the volcanic and basement calcareous units, and is typically absent at the limestone volcanic contact.

The character of the mineralization is very different between the volcanic and basement units. In the volcanic domain gold occurs associated with rare quartz veining and widespread dissemination in pyrite. In the limestone and black shale domains the mineralization is fracture controlled as multiple phases of quartz-carbonate veinlets. Mineralization occurs in the veinlets as electrum and sulfides with no disseminated mineralization in the host rock surrounding the veinlets. Grade correlates positively with the density of the quartz-carbonate veinlets and cohesive higher grade and dense areas of veining are well defined.

In the limestone and black shale hosted quartz-carbonate veins the dominant gold association is electrum with varying fineness. The second most important gold mineral is uytenbogaardtite (Ag3, AuS). The dominant silver mineral is silver rich polybasite (SEM work shows only trace copper). Typical epithermal minor minerals like pyrargyrite, proustite, naumanite, pyrite, galena, sphalerite and tetrahedrite. A Mn-rich sulfide called allabandite is also present.

The black shale hosted veins have higher contents of galena and sphalerite than the veins hosted by the limestone unit.

13.3 Sample Selection

- Limestone (LS and LC): Limestone (LS) samples comprised of 1m intervals taken of quartz-carbonate veining hosted by the limestone unit. The veined intervals selected are representative of the multiphase veining and mineralization typical of the limestone hosted portion of the Ixtaca deposit. Subsequent to preparation of the metallurgical test composites, it was discovered that material from a minor rock lithology in the deposit, basal conglomerate, was mistakenly included in the first three limestone composites referred to below as LC 01, LC 02 and LC 03. Nevertheless, the gravity and flotation test results for the LC samples are consistent with limestone sample metallurgical perfomance.
- Volcanic (VC): is comprised of 1m intervals taken of mineralized sections of the altered volcanic unit. Disseminated pyrite occurs along with minor quartz-carbonate veining. The mineralized intervals selected are representative of the disseminated pyrite typical of the volcanic hosted portion of the Ixtaca deposit.

- Black Shale (BS): is comprised of 1m intervals taken of quartz-carbonate veining hosted by the black shale unit. The veined intervals selected are representative of the multiphase veining and mineralization typical of the black shale unit portion of the Ixtaca deposit.

Assays for the metallurgical composites (a total of 11 samples) are presented in Table 13-2.

Table 13-2: Metallurgical Composite Sample's Head Assays

Element	Unit	Samples										
		BS Sample 01	BS Sample 02	BS Sample 03	LC Sample 01	LC Sample 02	LC Sample 03	LS Sample 04	LS Sample 05	VC Sample 01	VC Sample 02	VC Sample 03
Au	mg/kg	0.79	0.22	0.16	1.33	0.69	0.41	0.48	0.93	1.30	0.73	0.33
Ag	mg/kg	238	58	21	117	39	63	21	101	49	61	56
Cu	mg/kg	111	46	30	50	19	59	12	33	41	50	39
Fe	%	4.38	2.29	2.43	1.61	2.41	2.11	0.494	1.17	2.91	2.71	4.75
Mn	mg/kg	59,600	11,300	5,320	26,600	16,000	14,000	13,800	24,100	10,700	11,900	34,000
Pb	mg/kg	5,930	700	313	372	221	121	49	367	46.5	46.4	482
Zn	mg/kg	9,890	1,520	740	668	546	218	118	622	103	129	1,960
C (Total)	%	3.18	5.57	5.09	1.72	1.86	1.79	10.1	7.81	2.24	1.86	3.31
C (Organic)	%	0.47	0.71	0.82	0.01	0.01	< 0.01	< 0.01	< 0.01	0.05	0.02	< 0.01
C (Inorganic)	%	2.71	4.86	4.27	1.71	1.85	1.79	10.1	7.81	2.19	1.84	3.31
S (Total)	%	4.89	2.45	2.21	1.74	1.90	1.87	0.26	1.16	2.30	1.84	3.32
S (Sulfate)	%	0.20	0.17	0.01	0.10	0.27	0.12	<0.01	0.08	0.23	0.18	0.52
S (Sulphide)	%	4.69	2.28	2.20	1.64	1.63	1.75	0.26	1.08	2.07	1.66	2.80

Sample grades cover the range of potential grade variability from Ixtaca mill feed in the current mine plan..

Lead and Zinc grades appear relatively high in Black Shale 01 reaching approximately 0.59% and 1% respectively, consistently BS exhibits the highest total sulfur and sulfide sulfur among all samples. Samples Limestone 04 and Limestone 05 show the lowest values of total sulfur and sulfide among all the samples.

The assays show a presence of organic carbon in Black Shale samples.

13.4 Ball Mill Bond Work Index (BWi)

Results from standard Bond Work Index tests are shown in

Table 13-3. The Dyke, Limestone and Black Shale samples have a medium hardness ranging from 13.2 kWh/tonne for Limestone up to 18.6 kWh/tonne for Black Shale. (Note that dyke material is included in the Limestone Domain in this PEA Update)/ The Volcanic sample is significantly softer than the other samples with a BWi of 10.5 kWh/tonne.

Table 13-3: Bond Work Index Results

Mill feed Type	Bond Work Index, kWh/tonne
Dyke	14.6
Limestone	13.2
Black Shale	18.6
Volcanic	10.5

13.5 Extended Gravity Recovery Gold Tests (E-GRG)

Samples were subject to the standard E-GRG test to quantify their E-GRG value and characterize the gravity recovery potential for each ore type. Table and Figure 13-4 show that overall gold recovery ranged from a minimum of 20.2% for BS 03, up to a maximum of 53.4% for LC 03.

E-GRG results for silver shown in Table and Figure 13-5 were clearly lower than those of gold. Most of the samples indicate silver recovery in the 15% to 20% range, with only BS 02 reaching a higher silver recovery at 28.7%.

Table and Figure 13-4: E-GRG Test, Gold Results

Composite	Recovery, %Au, Nominal Grind Size		
	600µm	250µm	75µm
BS Sample 01	10.1	4.9	8.9
BS Sample 02	19.7	6.6	11.0
BS Sample 03	7.6	4.6	8.0
LC Sample 01	10.7	12.8	17.7
LC Sample 02	9.1	10.6	22.9
LC Sample 03	15.1	13.4	24.9
VC Sample 01	8.1	5.7	18.2
VC Sample 02	8.5	9.3	25.8
VC Sample 03	5.4	8.3	13.8

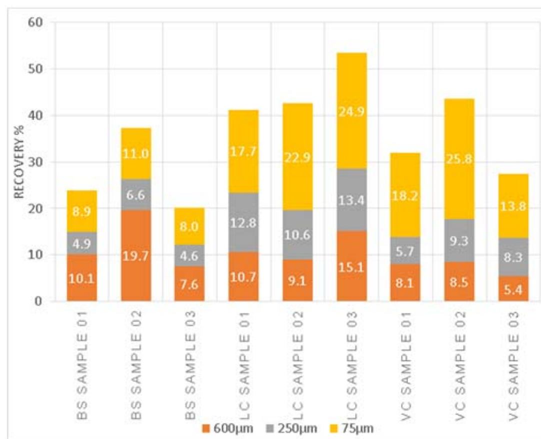
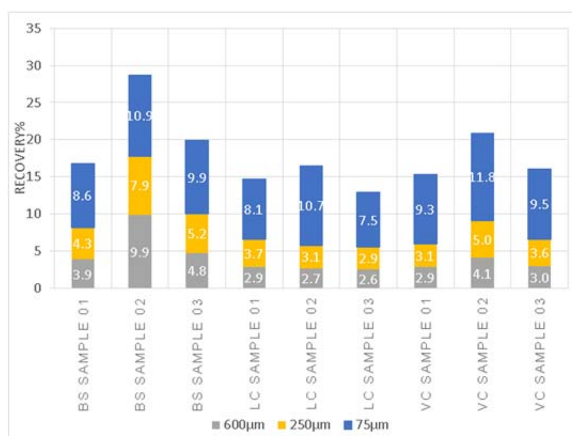


Table and Figure 13-5: E-GRG Test, Silver Results

Composite	Recovery, %Ag, Nominal Grind Size		
	600µm	250µm	75µm
BS Sample 01	3.9	4.3	8.6
BS Sample 02	9.9	7.9	10.9
BS Sample 03	4.8	5.2	9.9
LC Sample 01	2.9	3.7	8.1
LC Sample 02	2.7	3.1	10.7
LC Sample 03	2.6	2.9	7.5
VC Sample 01	2.9	3.1	9.3
VC Sample 02	4.1	5.0	11.8
VC Sample 03	3.0	3.6	9.5



The E-GRG tests indicated good gravity recovery potential for gold and a moderate gravity recovery of potential for silver. Recoveries significantly improved at finer grind (75 µm).

13.6 Gravity Concentration and Flotation Tests

13.6.1 Gravity Concentration

The testing considered gravity concentration followed by flotation of the gravity concentration tails as well as whole ore flotation.

Gravity concentration is achieved by one pass of the slurry through a centrifugal concentrator (Knelson machine) followed by further upgrading in a Mozzley shaking table to produce a gravity concentrate. Tails from both the Knelson and the Mozzley table are combined and become the flotation feed. Fresh feed to the Knelson machine consist of a sample ground down to P_{80}=212 µm, and fed at a slurry concentration of 25% solids.

Results from the gravity concentration stage are shown in Table 13-6. The best results were achieved with Limestone sample reaching gold recovery of 32.7%. Gravity recovery for silver recovery was insignificant for all the samples. The results in Table 13-6 indicate there is variability in gravity recovery within each metallurgical domain.

Table 13-6: Gravity Recovery Test Results

Test	Sample	Gravity Concentration Recovery	
		Au%	Ag%
G-2	BS Sample 01	0.8	0.5
G-3	BS Sample 02	2.1	2.2
G-4	BS Sample 03	1.8	2.2
G-1	LC Sample 01	12.8	1.3
G-5	LC Sample 02	7.3	0.5
G-6	LC Sample 03	3.8	0.4
G-7	VC Sample 01	5.7	5.1
G-10	LS Sample 04	32.7	1.2
G-11	LS Sample 05	9.1	0.8
G-8	VC Sample 02	3.7	0.4
G-9	VC Sample 03	0.9	0.7

Note:
LS and LC: Limestone
VC: Volcanic
BS: Black Shale

13.6.2 Flotation Concentration

Most of the flotation tests were conducted in a standard Denver laboratory flotation cell, with some tests using a larger 20 liter cell. The 20 litre cell had mechanical deficiencies (limited rpm and restricted flotation air intake) and delivered poor flotation results and testwork with this machine has been abandoned.

A total of 103 flotation tests have been performed. Variables optimized in the flotation tests included: flotation cell's rpm, flotation slurry concentration, mass pull, flotation time, limited alternative collector, frother, gold activators, and solids dispersant.

Precious metals recovery results for the optimized tests are summarized in Table 13-7. Overall the occurrence of fine mineralization observed in Ixtaca deposit is consistent with the liberation size of 53 µm selected for most samples, excepting Volcanic that suggests in two of its three samples a flotation feed P_{80} of 106 µm.

Table 13-7: Summary of Optimized Gravity + Flotation Tests Results

Sample	Test	Feed P80	Pull time minutes	Weight% Flot. Ro Con	Au grade Flot. Ro Con	Ag grade Flot. Ro Con	Rec %Au Flot. Ro Con	Rec %Au Grav+Flot Concentrate	Rec %Ag Flot. Ro Concentrate	Rec %Ag Grav+Flot Concentrate
BS Sample 01	F-69	53	56	37.5	1.74	553	95.7	96.4	94.4	94.8
BS Sample 02	F-70	53	49	30.4	0.63	164	94.6	96.1	93.2	95.3
BS Sample 03	F-71	53	49	26.4	0.46	83	91.2	93.3	89.5	91.5
BS Sample 03 (Whole Ore)	F-33	53	30	29.7	0.34	71	93.5		93.7	
LC Sample 01	F-52	53	21	17.0	7.44	705	83.1	97.3	93.6	94.9
LC Sample 02	F-53	53	21	18.9	2.96	226	91.7	98.7	92.5	93.0
LC Sample 03	F-54	53	22	20.5	1.41	272	93.6	97.4	93.0	93.4
LS Sample 04	F-100	53	12	28.8	1.88	110	66.8	94.8	91.3	94.7
LS Sample 05	F-97	53	31	16.0	5.51	604	83.8	92.0	92.5	93.7
VC Sample 01	F-102	53	20	39.9	3.15	102	86.0	90.1	90.3	90.9
VC Sample 01 (Whole Ore)	F-50	45	21	32.5	3.44	113	89.7		90.1	
VC Sample 02	F-73	106	19	18.5	3.00	271	77.3	80.7	80.0	80.5
VC Sample 03	F-74	106	19	16.9	1.39	281	81.6	82.6	94.3	95.0

Note:
LS and LC: Limestone
VC: Volcanic
BS: Black Shale

Rougher concentrate's mass pull is high in a number of cases, a follow up testing program should focus on improving selectivity in order to reduce the overall rougher concentrate stream mass ratio. Rougher concentrate grades are consistent with the mass pull achieved, i.e., the higher the mass pull-the lower concentrate grade.

Limestone sample's combined optimized gravity and flotation gold recovery ranged from 92.0% to 98.7%, and 93.7% to 94.7% for silver.

Volcanic sample's combined optimized gravity and flotation gold recovery yielded 80.7% and 82.6% for, and 80.5% and 95.0% for silver.

For Black Shale samples, the combined gravity concentration and flotation recovery of gold ranges from 93.3% to 96.4%, and 91.5% to 95.3% for silver. Flotation of BS's whole ore sample yielded 93.5% and 93.7% for gold and silver respectively.

13.7 Leach Tests

A total of 65 leaching tests have been performed on Ixtaca flotation concentrates at McClelland Laboratories Inc. focused on determining optimum leach conditions for each primary metallurgical domain.

Leach tests included cyanidation and carbon-in-leach using an agitated reactor or bottle rolls. Leaching optimization tested varied conditions including: regrinding, pretreatment with oxygen, varying cyanide concentration, addition of hydrogen peroxide, calcium peroxide, and lead nitrate, blinding agent, and roasting. The leach optimization tests are ongoing and results reported below are preliminary in nature.

13.7.1 Diagnostic Leach Test

Diagnostic leach tests have been carried out on the Limestone, Volcanics and Black shale concentrates to determine the proportion of gold and silver associated with different mineral phases. The diagnostic leach tests include sequential treatment of samples by cyanidation, followed by CIL for black shale, then aqua regia, roasting and finally a fire assay. The results of the diagnostic leach tests are summarized in Figure 13-2 and Figure 13-3.

The diagnostic leach tests show:

- Gold and Silver in Limestone concentrates is very liberated
- Silver is Volcanics is very liberated. A significant portion of the Gold in volcanics is extracted with Aqua Reqia indicating some gold is locked in sulphides minerals.
- Silver is Black Shale is liberated. Recovery is assisted with CIL. A significant portion of the Gold in Black Shale is extracted with Aqua Reqia indicating some gold is locked in sulphides minerals.

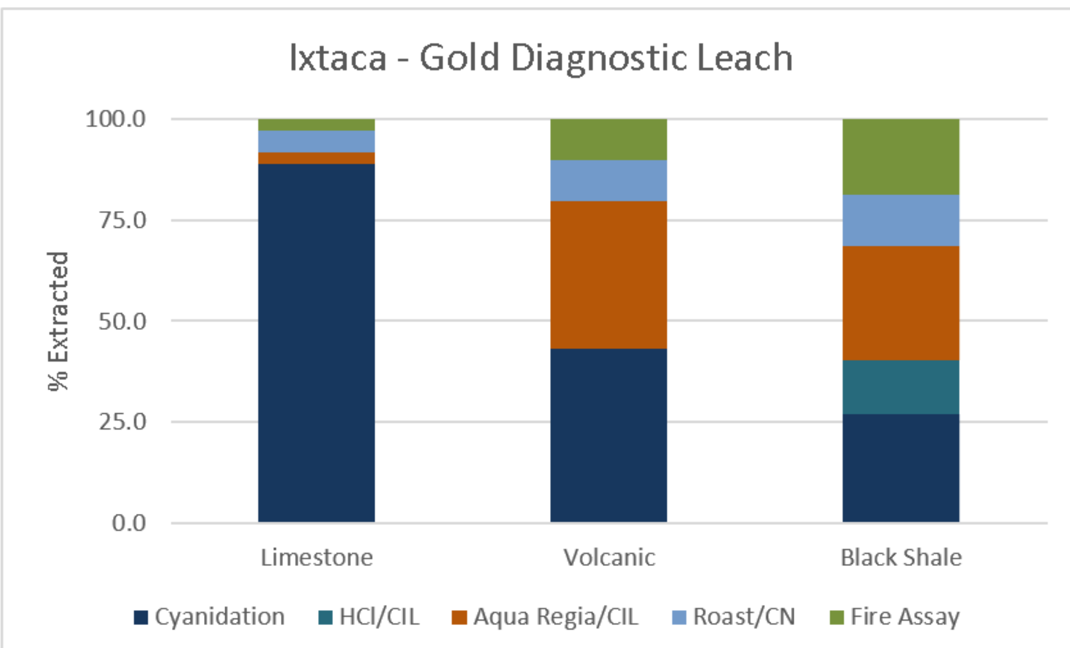


Figure 13-2: Gold Diagnostic Leach Tests

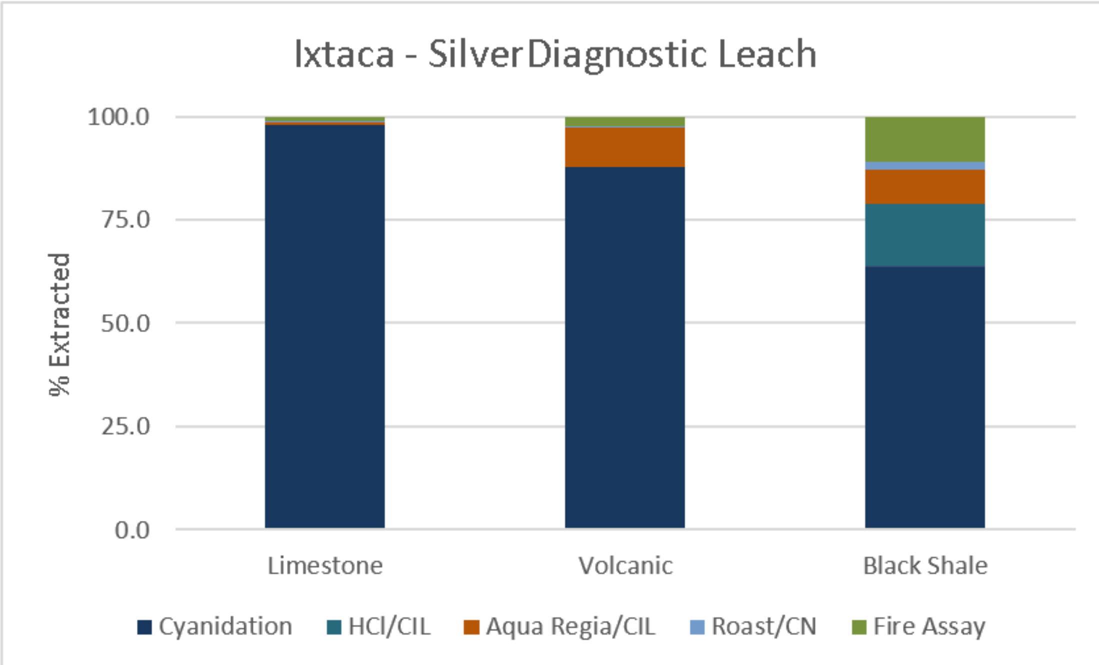


Figure 13-3: Silver Diagnostic Leach Tests

13.7.2 Gold Preg Robbing Assessment

Gold preg robbing tests show:

- Limestone does not have preg – robbing properties.
- Blackshale has gold preg – robbing properties.
- The base of the Volcanics has thin conglomerate layer, in some areas where the base of the Volcanics is in contact with black shale this material has gold preg-robbing potential.

Due to the small quantity and low priority of Blackshale material in this PEA, very little work has been carried out to mitigate the gold preg robbing. This will be addressed in future testwork when re-examining future pit expansion or underground potential is examined.

13.7.3 Summary of Optimized Leach Results

13.7.4 Limestone

A summary of the most recent optimized leach test results for limestone are shown in

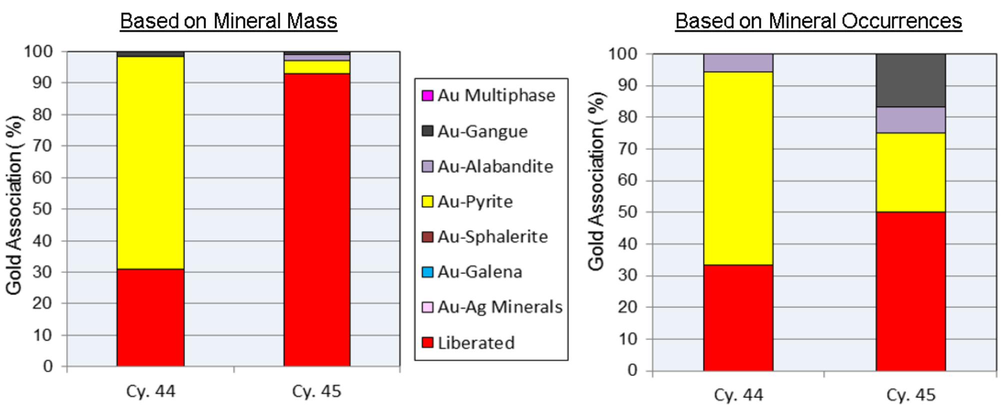
Table **13-8**.

Table 13-8: Limestone Leach Tests: Summary of Optimized Results

Test	Composite	Regrind	Pretreatment	NaCN g/l	Test Type	**Recovery Au%**	Grade Au Extracted g/t con	Grade Au Tail g/t con	Grade Au Calculated Head	Grade Au Con Assay	**Recovery Ag%**	Grade Ag Extracted g/t con	Grade Ag Tail g/t con	Grade Ag Calculated Head	Grade Au Con Assay	Reagent kg/t ore NaCN	Reagent kg/t ore Lime
CY-45	LS-05	30 minute	None, pulps were O2 sparges after sampling to keep DO Level >3ppm	10.0	CIL/CN	**90.6**	4.83	0.50	5.33	5.81	**97.0**	559	17	576	641	4.6	1.1
CY-64 & 65	LS-04	30 minute, brief re-grinding then re-leach	None, pulps were O2 sparges after sampling to keep DO Level >3ppm	10.0	CIL/CN	**98.9**	2.35	0.03	2.38	2.33	**94.9**	118	6	124	136	2.8	2.0

A Limestone leach tailings sample from test CY-45 was subject to an electronic microscopy analysis (Qemscan at BV Metallurgical Division in Vancouver, BC) that showed a significant number of un-leached free (liberated) gold particles in the tails sample, see **Figure 13-4**.

Figure 13-4: Electronic Microscopy Analysis of limestone leach tails (sample CY 45)



(source: BV Minerals Division)

Using the Limestone Qemscan results, a new test CY-64 was conducted under the same conditions of test CY-45, but its tails were subject to a brief re-grinding and then re-leached in CY-65. **Table 13-9** shows a significant increase in gold leach extraction achieved with the additional regrinding in CY-64 and CY-65. A future test work program needs to focus on optimizing the testing conditions of the Limestone sample to achieving similar, or better metal extraction, while leaching all liberated precious metals particles in a single leach step.

Table 13-9: Limestone Sample –Extraction Comparison of CY-45 and Cy 64&65

Test	Composite	Recovery Au%	Recovery Ag%
CY-45	LS-05	90.6	97.0
CY-64 & 65	LS-04	98.9	94.9

Cyanide consumption for Limestone was equivalent to 2.8 kg of cyanide per tonne of ore for LS-04, and 4.6 kg/tonne of ore for LS-05. Testwork to date has not focussed on optimising reagent consumption, this will be addressed in the ongoing test work.

13.7.5 Volcanic

A summary of the most recent optimized leach test results for volcanic are shown in **Table 13-10**

Table 13-10: Volcanic Leach Tests: Summary of Optimized Results

Test	Composite	Regrind	Pretreatment	NaCN g/l	Test Type	**Recovery Au%**	Grade Au Extracted g/t con	Grade Au Tail g/t con	Grade Au Calculated Head	Grade Au Con Assay	**Recovery Ag%**	Grade Ag Extracted g/t con	Grade Ag Tail g/t con	Grade Ag Calculated Head	Grade Au Con Assay	Reagent kg/t ore NaCN	Reagent kg/t ore Lime
CY-44	VC-01	30 minute	None, pulps were O2 sparges after sampling to keep DO Level >3ppm	10.0	CN	**45.7**	1.27	1.50	2.77	3.48	**84.5**	77	14	91	105	6.6	0.9
CY-58	VC 02	30 minute	None, pulps were O2 sparges after sampling to keep DO Level >3ppm	10.0	CIL	**49.9**	1.38	1.39	2.77	2.20	**91.1**	260	26	285	317	3.0	0.7
CY-61	VC-03	30 minute	None, pulps were O2 sparges after sampling to keep DO Level >3ppm	20.0	CN	**36.1**	0.52	0.91	1.43	1.54	**89.7**	288	33	321	315	3.5	1.2

Volcanic samples reached consistently high values for silver recovery ranged from 84.5% up to 97.5%.

Gold leach recovery from Volcanic samples ranged from 36.1% up to 49.9%. The Qemscan analysis of tails from the leaching the sample VC-01 in test CY-44 showed a potential for additional gold extraction from un-leached free gold particles, but the microscopy showed a number of ultrafine gold particles in the 5 µm size range encapsulated in pyrite. The microscopy work corroborates the diagnostic leach findings indicating that a significant portion of gold in the Volcanics metallurgical domain is finely disseminated in pyrite and may not be liberated with fine grinding.

13.7.6 Blackshale

A summary of the most recent optimized leach test results for Black Shale are shown in **Table 13-11**.

Table 13-11: Black Shale Leach Tests: Summary of Optimized Results

Test	Composite	Regrind	Pretreatment	NaCN g/l	Test Type	**Recovery Au%**	Grade Au Extracted g/t con	Grade Au Tail g/t con	Grade Au Calculated Head	Grade Au Con Assay	**Recovery Ag%**	Grade Ag Extracted g/t con	Grade Ag Tail g/t con	Grade Ag Calculated Head	Grade Au Con Assay	Reagent kg/t ore NaCN	Reagent kg/t ore Lime
CY-16	BS-01	None	None	5.0	CIL	**55.8**	1.09	0.86	1.95	2.12	**84.4**	488	90	578	677	5.4	3.1
CY-36	BS-02	None	Blinding Agent Test	5.0	CIL	**47.5**	0.66	0.72	1.38	0.89	**65.3**	137	73	210	221	1.9	0.7

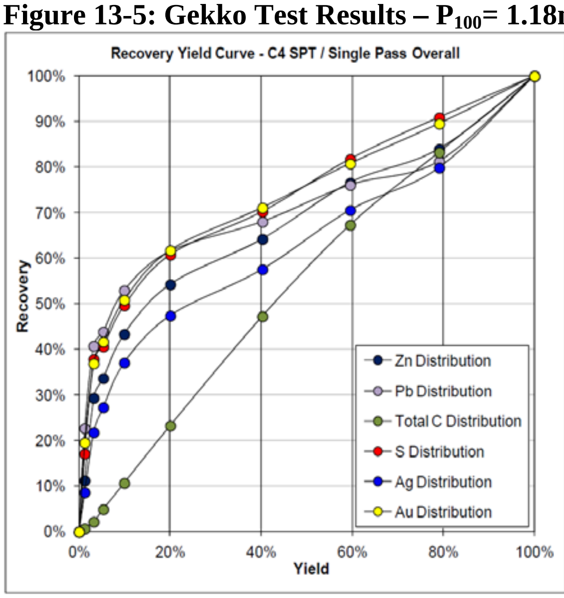
Black Shale's gold extraction ranged from 47.5% to 67.2% while silver extraction ranged from 65.3% to 84.4%. This highly variable extraction from Black Shale is largely contributed to the presence of preg robbing material and potential sulphide encapsulation.

Optimization of Black Shale leaching is a low priority due to the small proportion of mill feed (<2%) contributed by this metallurgical domain.

13.8 Gekko Systems Test Results

Gekko Systems, a company that manufactures inline pressure jig machines, has evaluated a Limestone sample for coarse gravity concentration potential under four different particle sizes, P_{100}=11.2 mm, P_{100}=6.7 mm, P_{100}=3.35 mm, and P_{100}=1.18 mm. Overall the recovery versus mass yield achieved is not enough to support a potential application of the inline pressure jig machine. The Figure 13-5 shows the results from testing at P_{100}=1.18 mm which is comparable to the results obtained with the other three samples at coarser size.

Figure 13-5: Gekko Test Results – P_{100}= 1.18mm



(source: Gekko)

13.9 Conclusions and Recommendations

Metallurgical optimization testwork has been undertaken on the primary Ixtaca ore domains. The metallurgical samples used in the testwork represent the planned mill feed rock types and grade ranges. Samples have been collected from within the planned ultimate pit limit. The optimization tests are ongoing.

A number of tests on Limestone samples representing 88% of Ixtaca mill feed (the vast majority) indicates high precious metals recovery. Combined gravity concentration and flotation of the gravity concentration tails has reached gold recoveries ranging from 92.0% to 94.8%, and silver recoveries of 93.7% to 94.7%. Leaching of the Limestone concentrate has achieved gold recoveries from 90.9% to 98.9%, and silver recoveries of 94.9% to 97.5%. Future testing of Limestone samples need to focus on improving the leaching kinetics, optimizing reagent consumption, and showing repeatability of the results.

The Volcanic sample represent a minor portion of the potential mill feed for Ixtaca at 10.7%. Gold recovery for Volcanic ranged from 80.7% to 90.1% in the gravity followed by flotation tests, and 36.1% to 49.9% in the leaching of the flotation concentrate. Silver recovery from gravity followed by flotation reached values ranging from 80.5% to 95%, and the leaching of the concentrate achieved silver recoveries ranging from 84.5% up to 91.1%.

The microscopy work, diagnostic leach, and leach test results all indicate that a significant portion of gold in the Volcanics metallurgical domain is finely disseminated in pyrite and may not be liberated with fine grinding. Future test work will test the production of a sellable pyrite concentrate from Volcanics leach tailings.

The Black Shale sample represents only 1.4% of the potential mill feed representing a very minor mill feed contribution. Gold recovery for Black Shale in the gravity followed by flotation ranged from 93.3% up to 96.4%, and leaching of the flotation concentrate achieved gold extractions ranging from 47.5% to 67.2%. The poor gold leaching extraction are attributed to a preg-robbing carbonaceous component. Silver recoveries in Black Shale ranged from 80.5% to 95.0% in the gravity followed by flotation, and the leaching of the concentrate ranged from 84.5% to 91.1%. Future testing on Black Shale samples will focus on alternative processing routes to conventional cyanidation, as well evaluating if preg-robbing is common to all Black Shale material in the Ixtaca deposit. Although the testwork on Black Shale is a low priority as mill feed will be comprise limestone material there are opportunities to improve gold recoveries which will be investigated in the ongoing metallurgical testwork.

Overall recovery assumptions recommended for this PEA Update are:

Table 13-12: Recommended PEA Process Recoveries

Metallurgical Domain	Gold Overall Process Recovery	Silver Overall Process Recovery
Limestone	90%	90%
Volcanics	50%	90%
Black Shale	50%	90%

14 MINERAL RESOURCE ESTIMATES

At the request of Morgan Poliquin, President of Almaden, Giroux Consultants Ltd. (GCL) was retained to produce an updated Resource Estimate on the Ixtaca Main Zone of the Tuligtic Property located in Puebla State, Mexico. There have been 198 additional diamond drillhole completed on the Tuligtic Property by Almaden since the last 43-101 Resource Estimate (K. Raffle, et.al. March 4, 2013) bringing the total number of drillhole on the Property to 423. The effective date for this estimate is January 8, 2014, the date the data was received.

Subsequent to this resource estimation, Almaden has completed an additional 49 drill holes in the Chemalaco and Main zones during 2014 and 2015. Of these holes 11 were metallurgical drill holes that twinned existing holes. The remainder were exploration holes testing the mineralized zones at depth. These holes all intersected the mineralized zones below the PEA pit described in this report and as a result are not material to this current resource.

Gary Giroux is the qualified person responsible for the Resource Estimate. Mr. Giroux is a qualified person by virtue of education, experience and membership in a professional association. He is independent of the company applying all of the tests in Section 1.5 of National Instrument 43-101. Mr. Giroux has not visited the Property.

14.1 Data Analysis

Almaden has supplied a total of 423 drillhole with 5,095 down hole surveys and 109,570 assays for gold and silver. Of these drillholes, 400 totalling 129,734m outline the Ixtaca Main zone and NE Extension which are estimated in this resource. All drillholes are included in Appendix A with the holes used in this resource highlighted. A total of 705 gaps have been found in the from – to record and in these gaps values of 0.001g/t Au and 0.01g/t Ag are inserted. Included in these gaps are 422 intervals at the start or end of holes that are not sampled due to broken rock which is cased or ends of holes that are not considered mineralized. Two gold and silver assays reported as blank are set to 0.001g/t and 0.01g/t respectively.

Almaden also supplied a series of geologic solids for the Ixtaca Zone, which outlined the following mineralized domains:

Code	**Description**
ASH	A clay altered tuff overlying the mineralized carbonate rocks
MHG	The Main Ixtaca High Grade Mineralized Zone comprised of varying density of carbonate-quartz epithermal veining
NEHG	A North east trending extension of High Grade carbonate-quartz epithermal veining
LGLS	A lower grade envelope within the Main Zone Limestone unit
LGSH	A lower grade envelope within the Main Zone Shale unit
NELGSH	A lower grade envelope of Shale surrounding the NEHG zone

From this list, 3 dimensional solids for each domain have been created in Gemcom software by Almaden geologists, to constrain the estimation. Figure 14-1 shows the various mineralized domains.

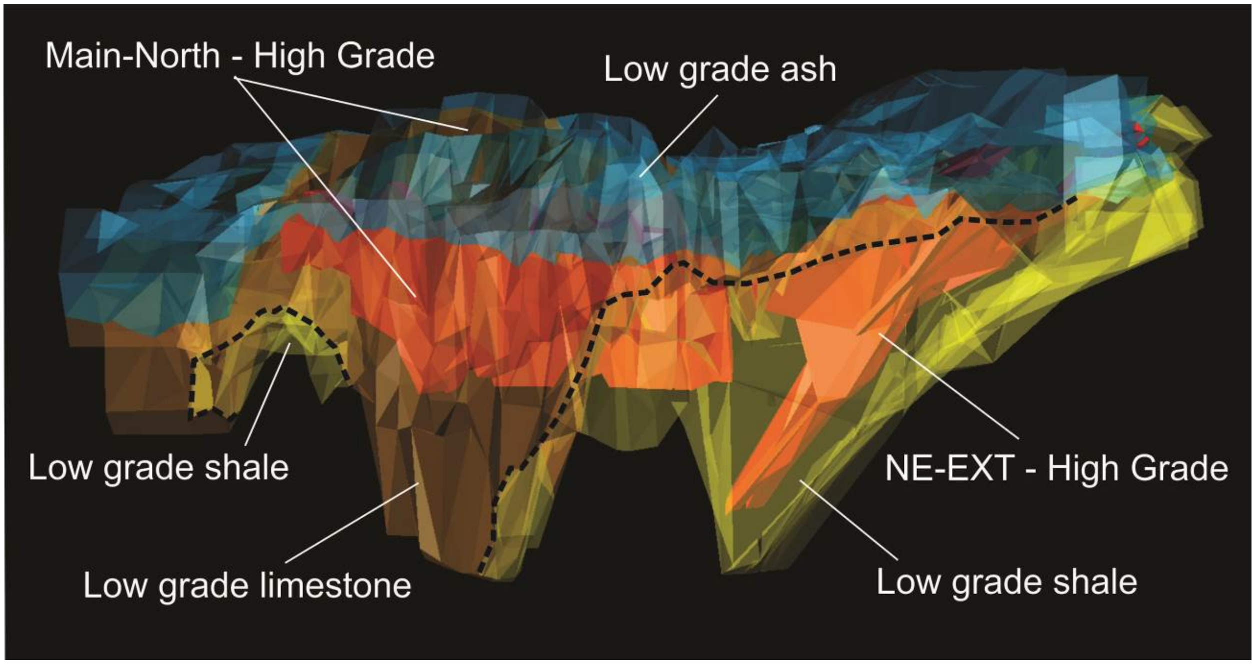


Figure 14-1 Isometric View Looking N Showing the Geologic Solids

Drillholes have then been compared to the solids and each assay has been tagged with a code. The statistics for gold and silver are tabulated in Table 14-1 below sorted by mineralized zone. Assays outside the mineralized solids are tagged as waste.

Table 14-1 Assay Statistics for Gold and Silver Sorted by Mineralized Zone

Domain	Variable	Number of Assays	Mean Grade	Standard Deviation	Minimum Value	Maximum Value	Coefficient of Variation
ASH	Au (g/t)	13,778	0.422	4.647	0.001	470.00	11.00
	Ag (g/t)	13,778	8.68	58.80	0.01	4340.00	6.78
MHG	Au (g/t)	11,643	1.247	5.080	0.001	336.00	4.08
	Ag (g/t)	11,643	82.51	236.21	0.01	9660.00	2.86
LGLM	Au (g/t)	38,382	0.261	1.784	0.001	167.00	6.83
	Ag (g/t)	38,382	17.40	95.07	0.01	5310.00	5.46
LGSH	Au (g/t)	3,376	0.186	0.992	0.001	38.00	5.34
	Ag (g/t)	3,376	11.58	60.44	0.01	2370.00	5.22
NELGSH	Au (g/t)	20,705	0.118	1.059	0.001	94.00	8.98
	Ag (g/t)	20,705	9.49	41.80	0.01	1490.00	4.41
NEHG	Au (g/t)	3,858	0.791	2.584	0.003	96.40	3.27
	Ag (g/t)	3,858	50.15	118.69	0.25	3140.00	2.37
WASTE	Au (g/t)	18,532	0.012	0.070	0.001	5.44	5.61
	Ag (g/t)	18,532	0.72	6.62	0.01	646.00	9.23

To determine if each of these geologic domains is unique the lognormal cumulative frequency plots for gold and silver are examined. The two high grade units are significantly different from the low grade units so these subdivisions should be honoured. While the low grade units in the Ash and Limestone are reasonably similar they do occur in different geographic areas so they should be modelled separately. The two shale units are also very similar but occur on different ends of the deposit.

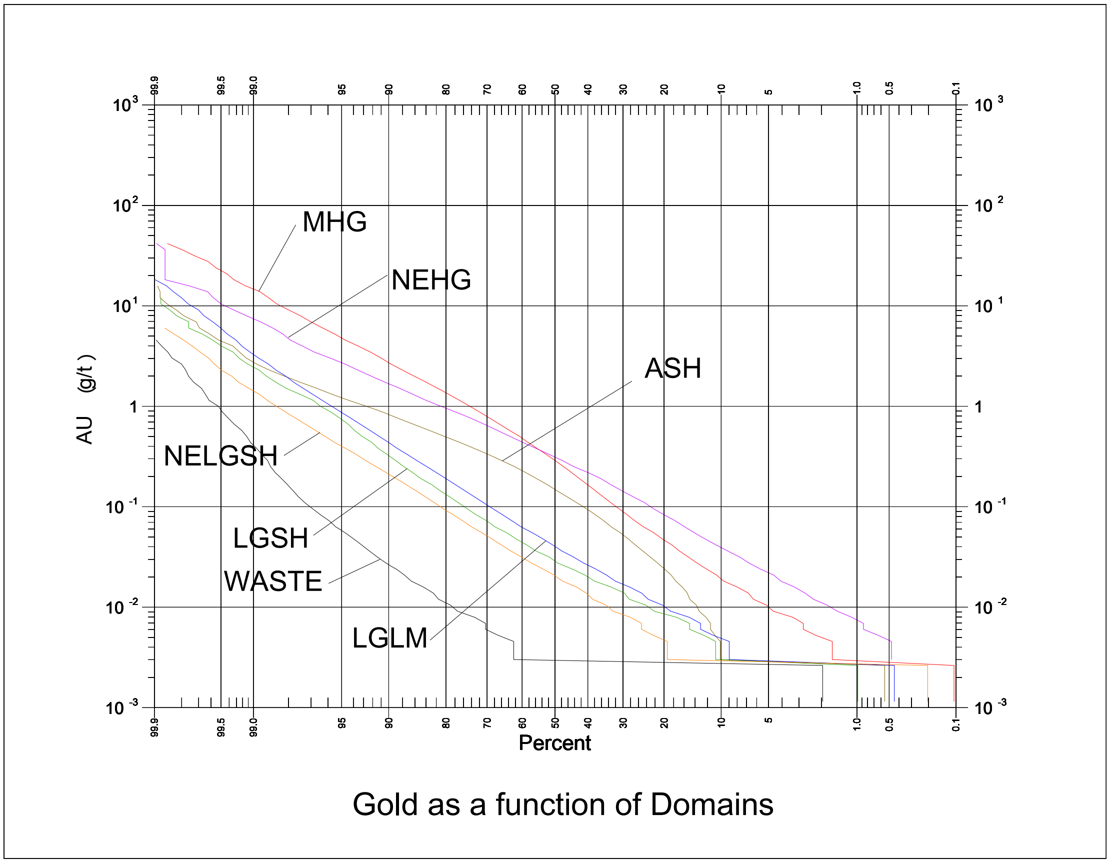


Figure 14-2 Lognormal Cumulative Frequency Plot for Au as a Function of Domain

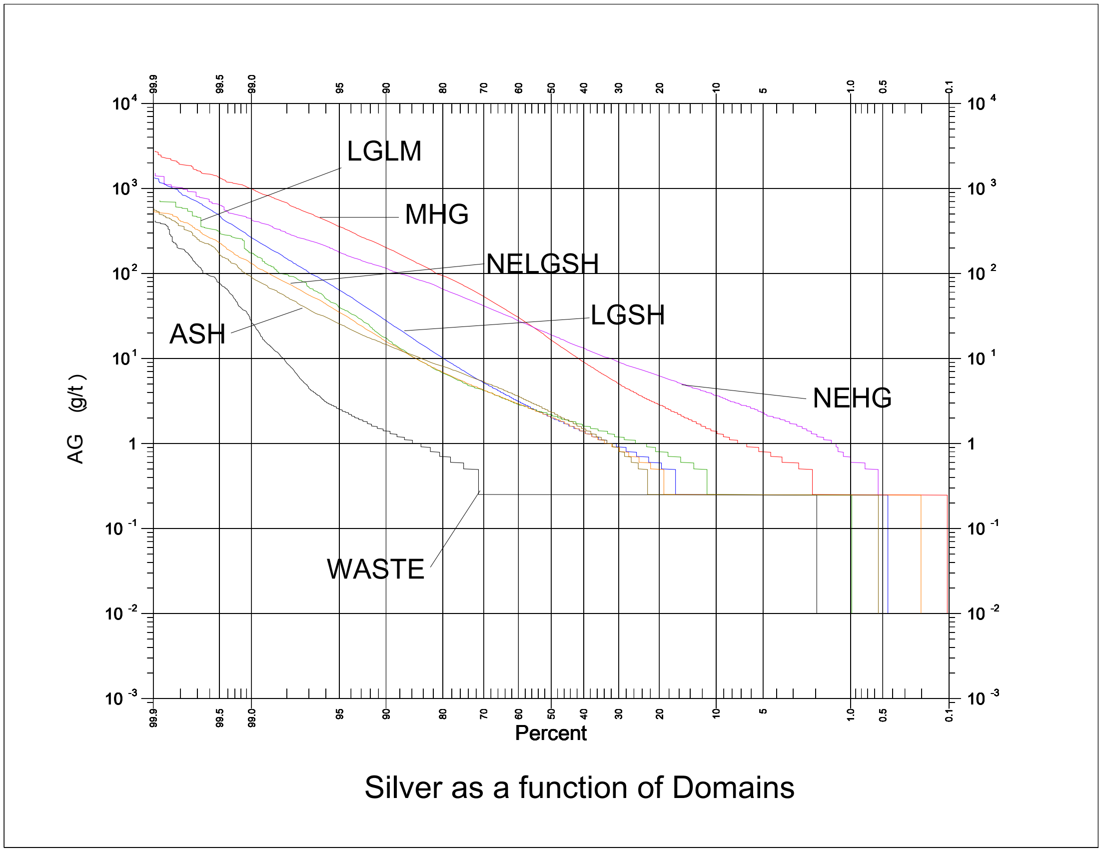


Figure 14-3 Lognormal Cumulative Frequency Plot for Ag as a Function of Domain

The grade distributions for gold and silver, within each mineralized domain, have been examined to determine if capping is required and if so, at what levels. Both elements show skewed distributions in all domains and have been converted to lognormal cumulative frequency plots. Each variable has been examined within each domain with thresholds selected for capping if required. (Table 14-2)

Table 14-2 Capped Levels for Gold and Silver

Domain	Variable	Cap Level (g/t)	Number of Assays capped
MHG	Au	56.0 g/t	6
	Ag	2150.0 g/t	18
ASH	Au	20.0 g/t	10
	Ag	500.0 g/t	16
LGLM	Au	41.0 g/t	11
	Ag	2200 g/t	10
LGSH	Au	6.0 g/t	8
	Ag	360.0 g/t	11
NELGSH	Au	13.0 g/t	5
	Ag	1100.0 g/t	4
NEHG	Au	17.0 g/t	5
	Ag	960.0 g/t	9
WASTE	Au	0.5 g/t	32
	Ag	50.0 g/t	14

The effects of capping are shown in the following Table 14-3 with minor reductions in mean grade but significant reductions in standard deviations and coefficients of variation.

Table 14-3 Capped Assay Statistics for Gold and Silver Sorted by Domain

Domain	Variable	Number of Assays	Mean Grade	Standard Deviation	Minimum Value	Maximum Value	Coefficient Of Variation
ASH	Au (g/t)	13,778	0.358	0.887	0.001	20.00	2.48
	Ag (g/t)	13,778	7.82	27.85	0.01	500.00	3.56
MHG	Au (g/t)	11,643	1.195	3.298	0.001	56.00	2.76
	Ag (g/t)	11,643	80.10	190.56	0.01	2150.00	2.38
LGLM	Au (g/t)	38,382	0.251	1.315	0.001	40.00	5.23
	Ag (g/t)	38,382	17.09	84.75	0.01	2200.00	4.96
LGSH	Au (g/t)	3,376	0.163	0.513	0.001	6.00	3.16
	Ag (g/t)	3,376	10.15	34.15	0.01	360.00	3.37
NELGSH	Au (g/t)	20,705	0.108	0.455	0.001	13.00	4.22
	Ag (g/t)	20,705	9.44	40.35	0.01	1100.00	4.27
NEHG	Au (g/t)	3,858	0.736	1.470	0.003	17.00	2.00
	Ag (g/t)	3,858	48.37	89.16	0.25	960.00	1.84
WASTE	Au (g/t)	18,532	0.011	0.034	0.001	0.50	2.98
	Ag (g/t)	18,532	0.64	2.12	0.01	50.00	3.32

14.2 Composites

Of the 110,275 assays, within the seven domains, 109,003 or 99% are less than or equal to 3 m in length. Of these samples 2.5% are less than 0.30 m, 2.3% are between 0.3 and 0.,5 m, 36% are between .5 m and 1 m, 56.2 % are between 1 m and 3 m and 3% are greater than 3 m. This deposit is an epithermal vein zone consisting of a 100 + m wide zone of veining comprised of hundreds if not thousands of veins and veinlets. All the core has been assayed and the higher grade zones have been constrained within high grade wire framed solids. The purpose of compositing is to bring the data to a common support and to reduce the effect of isolated high-grade samples. In this case individual assays were capped first and then composited to a 3 m length.. Down hole composites 3 m in length are formed to honour the domain boundaries. Composite intervals at the domain boundaries that are less than 1.5 m in length are combined with adjoining samples while those greater than or equal to 1.5 m are left alone. As a result, the composites form a uniform support of 3±1.5 m. Material outside the six mineralized solids is considered waste. (See

Table 14-4)

Table 14-4 3m Composite Statistics for Gold and Silver Sorted by Mineralized Zone

Domain	Variable	Number of Assays	Mean Grade	Standard Deviation	Minimum Value	Maximum Value	Coefficient Of Variation
ASH	Au (g/t)	6,699	0.270	0.519	0.001	12.20	1.92
	Ag (g/t)	6,699	5.77	15.34	0.01	355.15	2.66
MHG	Au (g/t)	2,824	0.880	1.454	0.001	20.67	1.65
	Ag (g/t)	2,824	58.85	86.99	0.01	1287.43	1.48
LGLM	Au (g/t)	13,568	0.158	0.478	0.001	11.72	3.03
	Ag (g/t)	13,568	9.94	31.45	0.01	1050.01	3.16
LGSH	Au (g/t)	1,153	0.114	0.263	0.001	3.06	2.31
	Ag (g/t)	1,153	7.12	18.50	0.01	223.96	2.60
NELGSH	Au (g/t)	7,253	0.073	0.230	0.001	8.33	3.13
	Ag (g/t)	7,253	6.40	19.15	0.01	660.60	2.99
NEHG	Au (g/t)	910	0.626	0.835	0.003	7.36	1.34
	Ag (g/t)	910	42.74	53.21	0.25	487.60	1.24
WASTE	Au (g/t)	11,061	0.008	0.021	0.001	0.46	2.70
	Ag (g/t)	11,061	0.40	1.07	0.01	56.70	2.68

To determine if hard or soft boundaries are required between the geologic domains, a series of Contact Plots have been produced. These plots examine the contact area between two geologic domains and compare the average grade for the variable being examined as a function of distance away from this contact. Where large differences appear at the contact, a Hard Boundary should be used with samples from one side of the contact not allowed to influence blocks on the other side. If, on the other hand, the differences are minimal or gradational then a Soft Boundary can be set up with samples allowed to influence block grades from both sides of a contact. The results are shown in Appendix B. The grades for Au across the contacts are sufficiently different for the LGLM-ASH, LGLM-NELGSH, ASH-NELGSH, MHG-LGLM and NEHG-NELGSH boundaries to make these all Hard Boundaries.

In the case of the LGLM-LGSH contact, the grades are sufficiently similar for Au across the contact, to make this a Soft Boundary. The grades for Ag across the contacts are sufficiently different for the ASH-NELGSH, MHG-LGLM and NEHG-NELGSH contacts to make these all Hard Boundaries.

For silver along the LGLM-ASH, LGLM-LGSH and LGLM-NELGSH contacts, the grades are sufficiently similar to make these Soft Boundaries.

14.3 Variography

Pairwise relative semivariograms have been produced for gold and silver within the each of the geologic domains. In all cases except for waste, a geometric anisotropy has been observed and nested spherical models are fit to the three principal directions. Due to the high correlation between Au and Ag in each of the domains, gold and silver show similar directions of anisotropy. (Table 14-5)

Table 14-5 Pearson Correlation Coefficients for Au – Ag Geologic Domains

Au:Ag	ASH	MHG	LGLS	LGSH	NEHG	NELGSH	WASTE
Correlation Coef.	0.7740	0.8781	0.8330	0.8336	0.5684	0.8013	0.7743

Within the Ash zone both gold and silver have been modelled with anisotropic models with longest range along azimuth 155^{o} dip 0^{o} and down dip along azimuth 245^{o} dip -45^{o}.

Within the Main High Grade zone the longest direction of continuity for both Au and Ag is along azimuth 60^{o} with the second longest range dipping -35^{o} along azimuth 150^{o}. A similar direction of anisotropy is observed within the low grade limestone unit that surrounds the Main High Grade Zones.

For the north east extension mineralization, the longest horizontal ranges in both the high grade core and low grade shale that surrounds it are found along azimuth 347^{o}.

For all of these models nested anisotropic spherical models are applied.

Within waste, both gold and silver show isotropic nested structures.

The semivariogram parameters are tabulated in the Table below and the models for gold are shown in Appendix C.

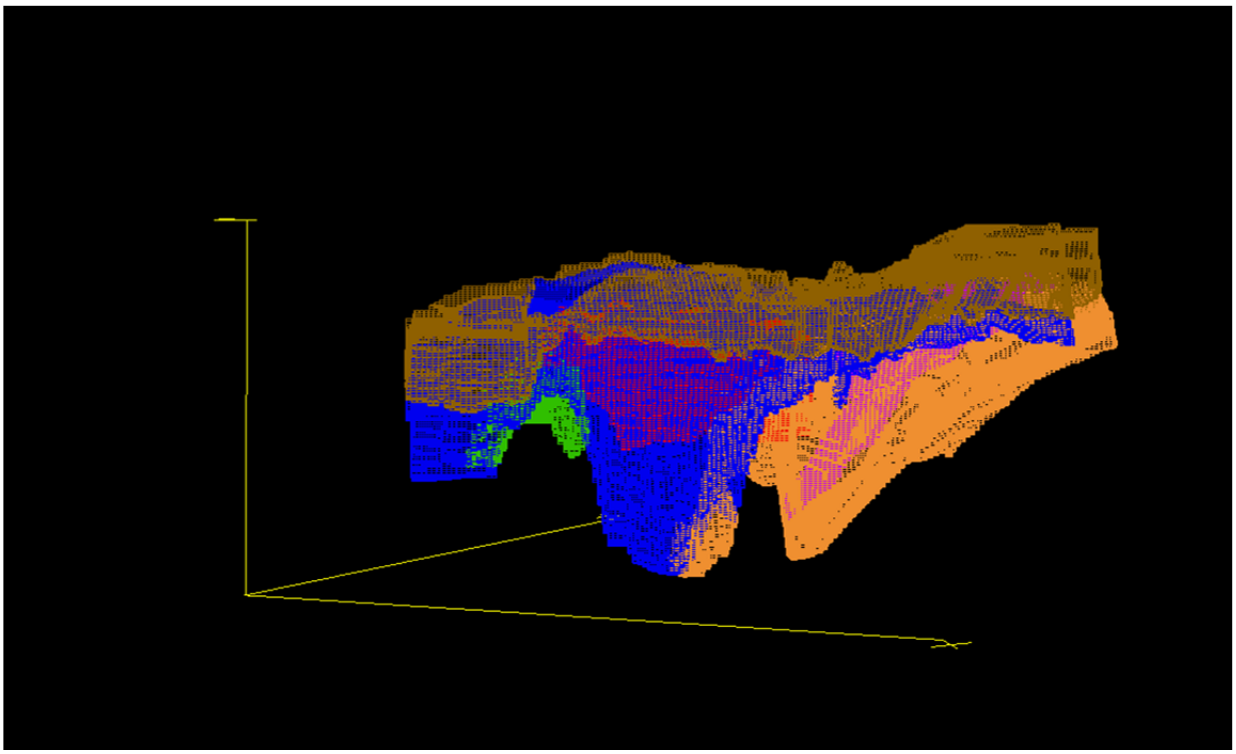
Table 14-6 Semivariogram Parameters for Gold and Silver

Domain	Variable	Az/Dip	C_0	C_1	C_2	Short Range (m)	Long Range (m)
MHG	Au	60º / 0º	0.35	0.38	0.20	10.0	120.0
		330º / -55º				12.0	100.0
		150º / -35º				12.0	120.0
	Ag	60º / 0º	0.45	0.30	0.18	12.0	140.0
		330º / -55º				15.0	70.0
		150º / -35º				15.0	100.0
ASH	Au	155º / 0º	0.20	0.18	0.70	10.0	120.0
		65º / -45º				15.0	50.0
		245º / -45º				20.0	90.0
	Ag	155º / 0º	0.20	0.20	0.60	10.0	120.0
		65º / -45º				15.0	50.0
		245º / -45º				15.0	90.0
LGLM	Au	60º / 0º	0.30	0.35	0.27	12.0	120.0
		330º / -55º				18.0	80.0
		150º / -35º				18.0	100.0
	Ag	60º / 0º	0.35	0.42	0.20	12.0	120.0
		330º / -55º				24.0	100.0
		150º / -35º				25.0	100.0
LGSH	Au	60º / 0º	0.20	0.30	0.37	15.0	30.0
		330º / -55º				10.0	50.0
		150º / -35º				15.0	60.0
	Ag	60º / 0º	0.20	0.40	0.27	20.0	50.0
		330º / -55º				10.0	50.0
		150º / -35º				30.0	80.0
NELGSH	Au	347º / 0º	0.20	0.25	0.35	40.0	140.0
		257º / -55º				12.0	210.0
		77º / -35º				15.0	100.0
	Ag	347º / 0º	0.20	0.35	0.15	28.0	90.0
		257º / -55º				15.0	210.0
		77º / -35º				20.0	60.0
NEHG	Au	347º / 0º	0.30	0.10	0.40	12.0	120.0
		257º / -55º				10.0	36.0
		77º / -35º				10.0	40.0
	Ag	347º / 0º	0.30	0.15	0.33	12.0	80.0
		257º / -55º				10.0	18.0
		77º / -35º				15.0	48.0
WASTE	Au	Omni Directional	0.08	0.30	0.06	36.0	110.0
	Ag	Omni Directional	0.05	0.45	0.12	36.0	110.0

14.4 Block Model

A rotated block model with blocks 10m NE-SW, 10m NW-SE and 5m high has superimposed over the mineralized solids. The model is rotated 30° counter clockwise to line up with drill sections and line up with the mineralized structures. Within each block, the percentage below surface topography and the percentage inside each mineralized solid are recorded. These percentages are checked to assure there is no overlap. The block model origin shown in Figure 14-4 is as follows:

Lower Left Corner		
618578 E	Column size = 10m	167 columns
2175235 N	Row size = 10m	128 rows Top of Model
2490 Elevation	Level size = 5m	180 levels Rotation 30° counter clockwise



Note: ASH in brown, MHG in red, LGLM in blue, LGSH in green, NEHG in purple and NELGSH in orange

Figure 14-4 Isometric View Looking NW Showing Blocks

14.5 Bulk Density

A total of 425 specific gravity determinations have been collected on a routine basis across the Ixtaca mineralized zone on cross sections 250E (western border of Ixtaca), 550E (central part of zone) and 1150E (eastern section of zone).

- Section 250E: Drillholes TU-11-030, TU-11-033, TU-11-040, TU-11-045, TU-11- 074 and TU-11-075.
- Section 550E: Drillholes TU-10-011, TU-10-013, TU-11-016, TU-11-019, TU-11- 059, TU-11-066 and TU-11-078.
- Section 1150E: Drillholes TU-11-041, TU-11-046, CA-11-002 and CA-11-003.

The measurements have been made on drill core samples using the Archimedes (weight in air-weight in water) method. The relative number of analysis is shown in the Table below:

Table 14-7 Specific Gravity Determinations Sorted by Cross Section

Cross Section	Number of Samples	Minimum SG	Maximum SG	Average SG
550 E	223	1.33	3.28	2.57
250 E	88	1.42	2.69	2.41
1150 E	114	1.43	3.21	2.60
Total	**425**	**1.33**	**3.28**	**2.55**

The data is also sorted by lithology.

Table 14-8 Specific Gravity Determinations Sorted by Lithology

Lithology Code	Lithology	Number of Samples	Average SG
Ash	Ash unit	33	1.67
Bx/Lm	Breccia / Limestone	3	2.45
Df	Felsic Dyke	71	2.46
Dm	Mafic Dyke	7	2.70
Dp	Porphyritic Dyke	25	2.59
Lch	Limestone/chert	58	2.65
Lg	Lime < 10% mud	10	2.67
Lm	Lime Mudstone	72	2.67
Lp	Lime Packstone	37	2.59
Ls	Limestone undifferentiated	2	2.65
Lw	Lime wackestone	2	2.58
Min	Mineralized qtz. veining	7	2.96
Pp	Principal Porphyry	2	2.58
ShB	Shale	56	2.61
ShG	Green Shale	3	2.44
Skn	Skarn	20	2.89
Slt	Siltstone	17	2.71

Table 14-8 summarizes specific gravity values for all lithologies studied in all three sections. Values in the Table have been averaged for each lithology. Values from these lithologies have then averaged within the various geologic domains to produce the following specific gravities for converting volumes to tonnes:

- The ash domain has an average specific gravity of 1.67
- The low grade limestone (LGLM) domain has an average specific gravity of 2.66
- The main high grade (MHG) domain has an average specific gravity of 2.63 (this unit contains about 20% Felsic Dyke)
- The main high grade zone (MHGN) North limb has an average specific gravity of 2.60 (this north limb contains about 40% Felsic Dyke and 40% Mafic Dyke)
- The low grade shale (LGSH) domain has an average specific gravity of 2.61
- The North East extension high grade (NEHG) domain has an average specific gravity of 2.65

14.6 Grade Interpolation

Grades for gold and silver have been interpolated into the blocks by Ordinary Kriging. Each domain is treated separately with hard boundaries used, except for the LGLM, LGSH and NELGSH domains where contact plots show a soft boundary is appropriate. For example, blocks with some percentage of MHG present have been kriged for Au and Ag using only composites from within the MHG domain while blocks with some percentage of LGLM can see composites within both the LGLM and LGSH domains. Blocks containing more than one domain are estimated for each domain and a weighted average is then produced.

Each kriging run has been completed in a series of passes with the search ellipse orientation and dimension a function of the semivariogram for the domain and variable being estimated. The first pass uses search dimensions equal to ¼ the semivariogram range in the three principal directions. A minimum of four composites are required to estimate a block with a maximum of three from any given drillhole. In this manner, all blocks are estimated with a minimum of two drillhole. For blocks not estimated in pass 1, a second pass using ½ the semivariogram range has been completed. A third pass using the full range and a fourth pass using twice the range has followed. Finally because there were many blocks containing multiple domains, a fifth pass has often been required to ensure all domains were estimated. In all passes the maximum number of composites used is twelve and if more were found in any search the closest twelve are used.

Once all domains are completed, estimated blocks containing some percentage outside the mineralized domains are estimated in a similar manner using composites from outside the mineralized domains (waste).

Finally for all blocks along the contacts, containing multiple domains, a weighted average grade for gold and silver is produced. The search parameters for gold within each domain and the number of blocks estimated in each pass are tabulated in the following Table.

Table 14-9 Kriging Parameters for Gold in Each Domain

Domain	Pass	Number Estimated	Az /Dip	Dist. (m)	Az /Dip	Dist. (m)	Az /Dip	Dist. (m)
MHG	1	14,220	60 / 0	30.0	330 / -55	25.0	150 / -35	30.0
	2	8,773	60 / 0	60.0	330 / -55	50.0	150 / -35	60.0
	3	792	60 / 0	120.0	330 / -55	100.0	150 / -35	120.0
NEHG	1	508	347 / 0	30.0	257 / -55	9.0	77 / -35	10.0
	2	4,916	347 / 0	60.0	257 / -55	18.0	77 / -35	20.0
	3	7,714	347 / 0	120.0	257 / -55	36.0	77 / -35	40.0
	4	1,578	347 / 0	240.0	257 / -55	72.0	77 / -35	80.0
LGLM	1	47,121	60 / 0	30.0	330 / -55	20.0	150 / -35	25.0
	2	106,984	60 / 0	60.0	330 / -55	40.0	150 / -35	50.0
	3	58,743	60 / 0	120.0	330 / -55	80.0	150 / -35	100.0
	4	11,282	60 / 0	240.0	330 / -55	160.0	150 / -35	200.0
NELGSH	1	65,307	347 / 0	35.0	257 / -55	52.5	77 / -35	25.0
	2	82,293	347 / 0	70.0	257 / -55	105.0	77 / -35	50.0
	3	27,998	347 / 0	140.0	257 / -55	210.0	77 / -35	100.0
	4	472	347 / 0	280.0	257 / -55	420.0	77 / -35	200.0
ASH	1	13,923	155 / 0	30.0	65 / -45	12.5	245 / -45	22.5
	2	51,013	155 / 0	60.0	65 / -45	25.0	245 / -45	45.0
	3	50,819	155 / 0	120.0	65 / -45	50.0	245 / -45	90.0
	4	12,622	155 / 0	240.0	65 / -45	100.0	245 / -45	180.0
LGSH	1	198	60 / 0	7.5	330 / -55	12.5	150 / -35	15.0
	2	2,402	60 / 0	15.0	330 / -55	25.0	150 / -35	30.0
	3	8,287	60 / 0	30.0	330 / -55	50.0	150 / -35	60.0
	4	7,123	60 / 0	60.0	330 / -55	100.0	150 / -35	120.0
WASTE	1	7,138	Omni Directional			27.5		
	2	28,078	Omni Directional			55.0		
	3	49,245	Omni Directional			110.0		
	4	19,292	Omni Directional			220.0		

14.7 Classification

Based on the study herein reported, delineated mineralisation of Ixtaca is classified as a resource according to the following definitions from National Instrument 43-101 and from CIM (2014):

> "In this Instrument, the terms "Mineral Resource", "Inferred Mineral Resource", "Indicated Mineral Resource" and "Measured Mineral Resource" have the meanings ascribed to those terms by the Canadian Institute of Mining, Metallurgy and Petroleum, as the CIM Definition Standards (May 2014) on Mineral Resources and Mineral Reserves adopted by CIM Council, as those definitions may be amended."

The terms Measured, Indicated and Inferred are defined by CIM (2014) as follows:

> "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 term Mineral Resource covers mineralisation and natural material of intrinsic economic interest which has been identified and estimated through exploration and sampling and within which Mineral Reserves may subsequently be defined by the consideration and application of Modifying Factors. The phrase 'reasonable prospects for economic extraction' implies a judgement by the Qualified Person in respect of the technical and economic factors likely to influence the prospect of economic extraction. The Qualified Person should consider and clearly state the basis for determining that the material has reasonable prospects for eventual economic extraction. Assumptions should include estimates of cut-off grade and geological continuity at the selected cut-off, metallurgical recovery, smelter payments, commodity price or product value,

mining and processing method and mining, processing and general and administrative costs. The Qualified Person should state if the assessment is based on any direct evidence and testing. Interpretation of the word 'eventual' in this context may vary depending on the commodity or mineral involved. For example, for some coal, iron, potash deposits and other bulk minerals or commodities, it may be reasonable to envisage 'eventual economic extraction' as covering time periods in excess of 50 years. However, for many gold deposits, application of the concept would normally be restricted to perhaps 10 to 15 years, and frequently to much shorter periods of time."

Inferred Mineral Resource

"An 'Inferred Mineral Resource' is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration."

"An 'Inferred Mineral Resource' is based on limited information and sampling gathered through appropriate sampling techniques from locations such as outcrops, trenches, pits, workings and drill holes. Inferred Mineral Resources must not be included in the economic analysis, production schedules, or estimated mine life in publicly disclosed Pre-Feasibility or Feasibility Studies, or in the Life of Mine plans and cash flow models of developed mines. Inferred Mineral Resources can only be used in economic studies as provided under NI 43-101."

"There may be circumstances, where appropriate sampling, testing, and other measurements are sufficient to demonstrate data integrity, geological and grade/quality continuity of a Measured or Indicated Mineral Resource, however, quality assurance and quality control, or other information may not meet all industry norms for the disclosure of an Indicated or Measured Mineral Resource. Under these circumstances, it may be reasonable for the Qualified Person to report an Inferred Mineral Resource if the Qualified Person has taken steps to verify the information meets the requirements of an Inferred Mineral Resource."

Indicated Mineral Resource

"An 'Indicated Mineral Resource' is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve."

"Mineralisation may be classified as an Indicated Mineral Resource by the Qualified Person when the nature, quality, quantity and distribution of data are such as to allow confident interpretation of the geological framework and to reasonably assume the continuity of mineralisation. The Qualified Person must recognise the importance of the Indicated Mineral Resource category to the advancement of the feasibility of the project. An Indicated Mineral Resource estimate is of sufficient quality to support a Preliminary Feasibility Study which can serve as the basis for major development decisions."

Measured Mineral Resource

"A Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation. A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve."

"Mineralisation or other natural material of economic interest may be classified as a Measured Mineral Resource by the Qualified Person when the nature, quality, quantity and distribution of data are such that the tonnage and grade or quality of the mineralisation can be estimated to within close limits and that variation from the estimate would not significantly affect potential economic viability of the deposit. This category requires a high level of confidence in, and understanding of, the geology and controls of the mineral deposit."

Modifying Factors

"Modifying Factors are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors."

At Ixtaca, the geologic continuity has been established through surface mapping and drillhole interpretation. This has resulted in a multi domain interpretation that has been used to constrain the Resource Estimate. The grade continuity within each domain has been quantified by semivariogram analysis. The semivariograms have been used to determine the search directions and distances for each pass in the kriging procedure. Using the semivariogram range to estimate blocks would normally allow classification as follows:

- Blocks estimated in Pass 1 using ¼ of the semivariogram range might be considered Measured.
- Blocks estimated in Pass 2 using ½ of the semivariogram range might be considered Indicated
- All other blocks would be classified as Inferred.

A range of cut-offs are presented to demonstrate the sensitivity of the deposit to grade variations.

The Resource Tables are shown below using gold equivalent cut-offs where:

Gold – 3 yr. trailing average price of $1540
Silver – 3 yr. trailing average price of $30

Preliminary metallurgy has shown roughly equivalent metal recoveries for Au and Ag so for now the Au Equivalent equation is:

$$AuEq = Au + (Ag * 30 / 1540)$$

At the time the resource was estimated no economic studies had been completed at Ixtaca. In the author's judgement and experience the resource stated has reasonable prospects of economic extraction. A cut-off of 0.50g/t AuEq has been highlighted as a possible cut-off for open pit mining. An analogous deposit to Ixtaca might be the Dolores Mine in Chihuahua, Mexico. A reported mining cut-off for this deposit is 0.3 g/t AuEq (Chlumsky, et al, 2011). The deposits are comparable in both gold and silver grades but Dolores uses heap leach recovery while Ixtaca is contemplating milling. As a result a 0.5 g/t AuEq cut-off was considered reasonable. The work described further in this PEA study establishes an NSR cut-off and tabulates the resource present within an optimized pit shell.

Table 14-10 Measured Resource for Total Blocks

AuEq Cut-off (g/t)	Tonnes > Cut-off (tonnes)	Grade>Cut-off			Contained Metal x1000		
		Au (g/t)	Ag (g/t)	AuEq (g/t)	Au (ozs)	Ag (ozs)	AuEQ (ozs)
0.10	76,600,000	0.31	19.72	0.70	768	48,570	1,714
0.20	56,340,000	0.40	25.36	0.89	725	45,940	1,619
0.25	49,730,000	0.44	27.92	0.98	704	44,640	1,573
0.30	44,550,000	0.48	30.28	1.07	682	43,370	1,527
0.40	36,460,000	0.55	34.89	1.23	640	40,900	1,437
0.50	**30,420,000**	**0.61**	**39.44**	**1.38**	**599**	**38,570**	**1,350**
0.60	25,860,000	0.67	43.82	1.53	560	36,430	1,270
0.70	22,300,000	0.73	48.02	1.67	526	34,430	1,196
0.80	19,420,000	0.79	52.08	1.80	493	32,520	1,126
1.00	15,620,000	0.88	58.66	2.03	444	29,460	1,017
2.00	6,000,000	1.33	86.54	3.01	256	16,690	581

Table 14-11 Indicated Resource for Total Blocks

AuEq Cut-off (g/t)	Tonnes > Cut-off (tonnes)	Grade>Cut-off			Contained Metal x1000		
		Au (g/t)	Ag (g/t)	AuEq (g/t)	Au (ozs)	Ag (ozs)	AuEQ (ozs)
0.10	208,220,000	0.24	13.06	0.50	1,627	87,430	3,334
0.20	145,640,000	0.32	17.08	0.65	1,484	79,980	3,044
0.25	125,610,000	0.35	18.90	0.72	1,413	76,330	2,900
0.30	108,520,000	0.38	20.78	0.79	1,336	72,500	2,749
0.40	81,460,000	0.45	24.78	0.93	1,184	64,900	2,446
0.50	**62,250,000**	**0.52**	**28.92**	**1.09**	**1,043**	**57,880**	**2,172**
0.60	48,710,000	0.59	33.15	1.23	921	51,920	1,933
0.70	39,350,000	0.65	37.12	1.37	824	46,960	1,738
0.80	32,810,000	0.71	40.64	1.50	747	42,870	1,581
1.00	23,750,000	0.81	47.12	1.73	621	35,980	1,322
2.00	5,880,000	1.39	72.89	2.81	263	13,780	532

Table 14-12 Inferred Resource for Total Blocks

AuEq Cut-off (g/t)	Tonnes > Cut-off (tonnes)	Grade>Cut-off			Contained Metal x1000		
		Au (g/t)	Ag (g/t)	AuEq (g/t)	Au (ozs)	Ag (ozs)	AuEQ (ozs)
0.10	101,730,000	0.21	9.63	0.40	677	31,500	1,292
0.20	62,210,000	0.29	13.71	0.56	576	27,420	1,110
0.25	50,850,000	0.32	15.68	0.63	530	25,640	1,030
0.30	42,490,000	0.36	17.58	0.70	488	24,020	956
0.40	30,250,000	0.43	21.35	0.84	415	20,760	820
0.50	**22,150,000**	**0.50**	**25.14**	**0.99**	**355**	**17,900**	**704**
0.60	16,940,000	0.57	28.55	1.12	309	15,550	612
0.70	13,400,000	0.63	31.66	1.25	273	13,640	539
0.80	10,810,000	0.70	34.57	1.37	242	12,010	476
1.00	7,620,000	0.80	39.85	1.57	195	9,760	385
2.00	1,200,000	1.18	73.69	2.61	45	2,840	101

Table 14-13 Measured + Indicated Resource for Total Blocks

AuEq Cut-off (g/t)	Tonnes > Cut-off (tonnes)	Grade>Cut-off			Contained Metal x1000		
		Au (g/t)	Ag (g/t)	AuEq (g/t)	Au (ozs)	Ag (ozs)	AuEQ (ozs)
0.10	284,800,000	0.26	14.85	0.55	2,399	135,980	5,045
0.20	201,980,000	0.34	19.39	0.72	2,208	125,920	4,663
0.25	175,330,000	0.38	21.46	0.79	2,114	120,970	4,470
0.30	153,070,000	0.41	23.55	0.87	2,018	115,900	4,277
0.40	117,910,000	0.48	27.90	1.02	1,823	105,770	3,882
0.50	**92,680,000**	**0.55**	**32.38**	**1.18**	**1,642**	**96,490**	**3,522**
0.60	74,570,000	0.62	36.85	1.34	1,482	88,350	3,203
0.70	61,640,000	0.68	41.06	1.48	1,350	81,370	2,933
0.80	52,230,000	0.74	44.89	1.61	1,239	75,380	2,709
1.00	39,370,000	0.84	51.70	1.85	1,065	65,440	2,339
2.00	11,880,000	1.36	79.78	2.91	519	30,470	1,113

Where Total Blocks means one would mine complete 10 x 10 x 5 m blocks taking in dilution around the edges of the mineralized solids.

14.8 Block Model Verification

To check the results, level plans have been produced on 50m intervals through the deposit. Estimated block grades have been checked against composite grades above and below the bench level. The results matched reasonably well with no bias indicated. Example bench levels are show in Figure 14-5 to Figure 14-9 for bench levels 2250 down to 2050. Another check on the results has been completed by comparing the average composite grade for each domain with the average kriged grades for that domain. (Table 14-1414)

Table 14-14 Comparison of Composite Mean Au Grade to Block Mean Au Grade

Domain	Variable	Number of Assays	Mean Grade Composites	Number of Blocks	Mean Grade Blocks
ASH	Au (g/t)	6,699	0.27	128,377	0.23
	Ag (g/t)	6,699	5.77	128,377	5.75
MHG	Au (g/t)	2,824	0.88	23,785	0.88
	Ag (g/t)	2,824	58.85	23,785	59.94
LGLM	Au (g/t)	13,568	0.16	224,130	0.14
	Ag (g/t)	13,568	9.94	224,130	7.92
LGSH	Au (g/t)	1,153	0.11	18,010	0.15
	Ag (g/t)	1,153	7.12	18,010	7.54
NEHG	Au (g/t)	910	0.63	14,716	0.70
	Ag (g/t)	910	42.74	14,716	44.65
NELGSH	Au (g/t)	7,253	0.07	176,070	0.09
	Ag (g/t)	7,253	6.40	176,070	6.33
WASTE	Au (g/t)	11,061	0.008	103,753	0.016
	Ag (g/t)	11,061	0.40	103,753	0.84

The following legend can be used to show the levels of gold found in the Figures below:

- Au >= 0.0 < 0.2g/t is shown in black
- Au >= 0.2 < 0.4g/t is shown in blue
- Au >= 0.4 < 0.6g/t is shown in green
- Au >= 0.6 < 0.8g/t is shown in orange
- Au >= 0.8 < 1.0g/t is shown in red
- Au >= 1.0g/t is shown in pink
- Composite show 10m above and below bench.

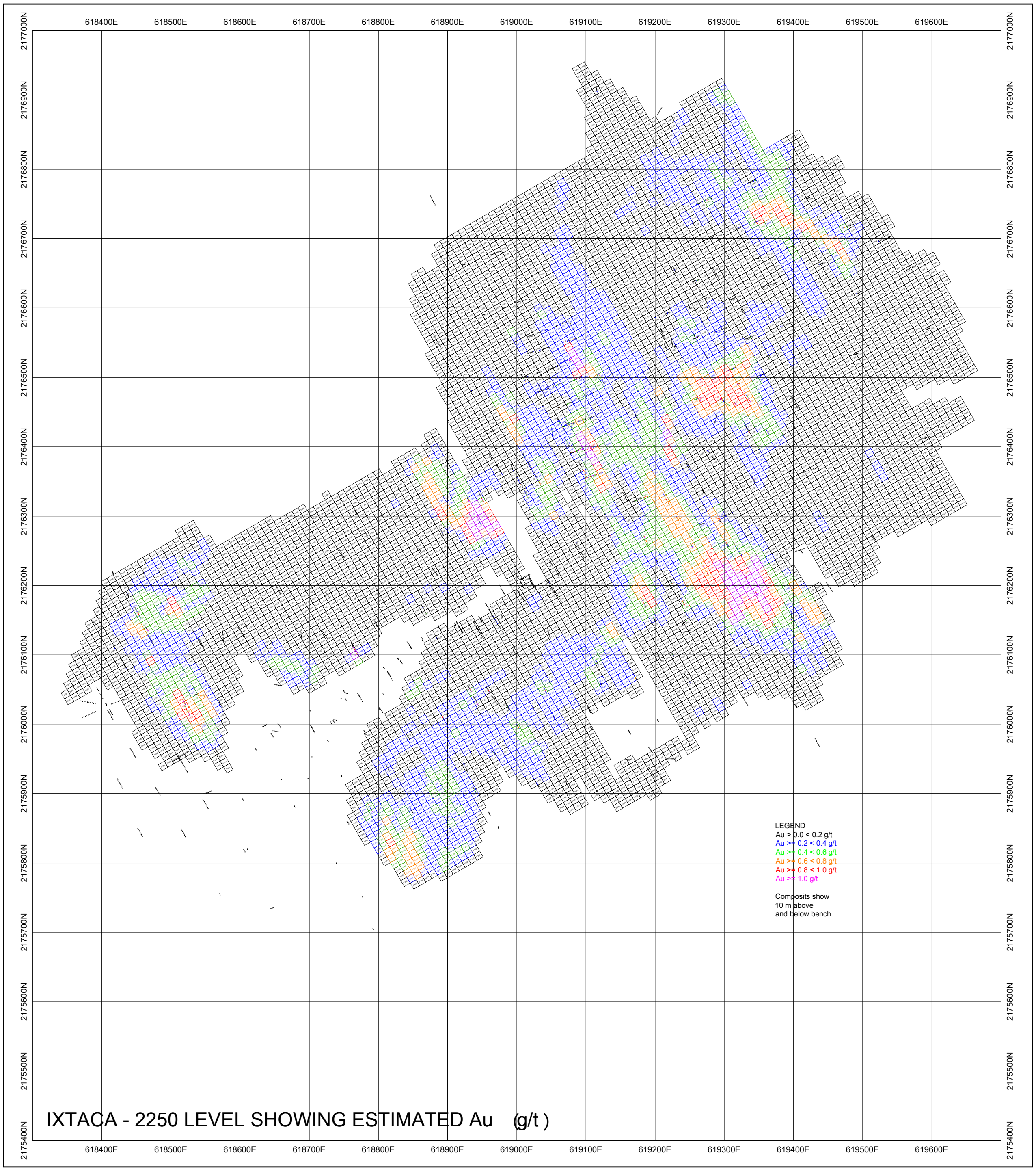


Figure 14-5 Ixtaca 2250 Level Plan Showing Estimated Gold in Blocks

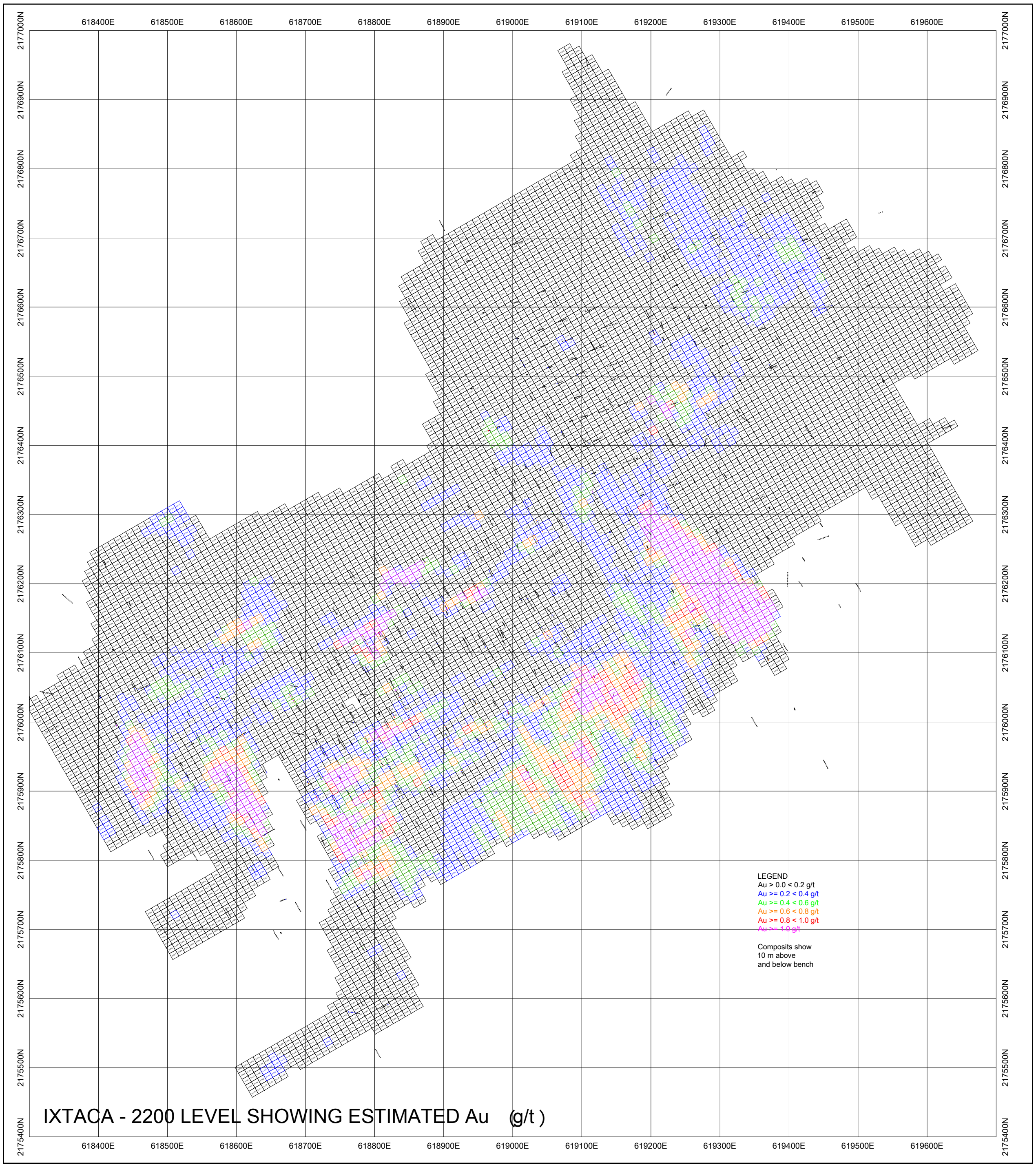


Figure 14-6 Ixtaca 2200 Level Plan Showing Estimated Gold in Blocks

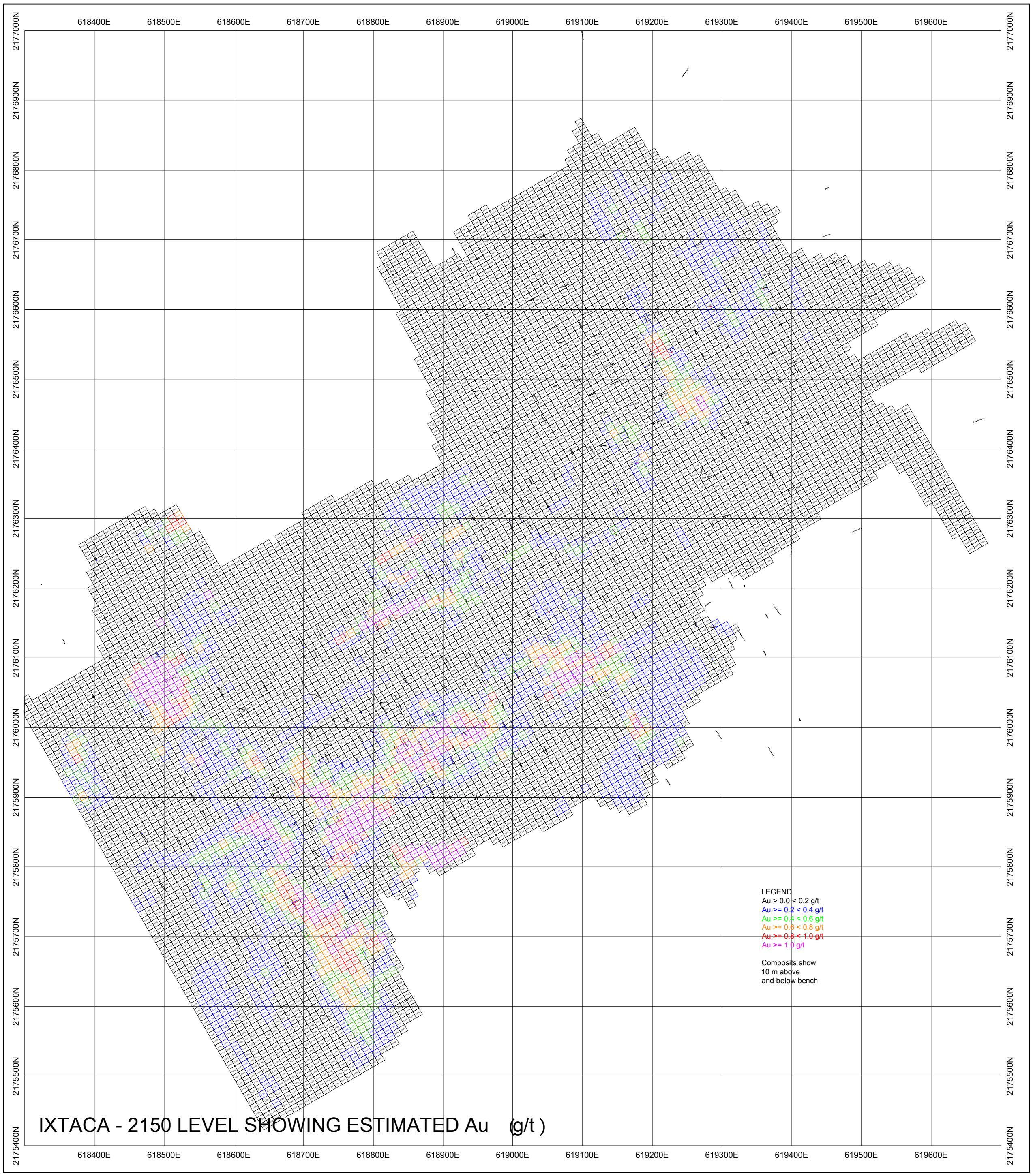


Figure 14-7 Ixtaca 2150 Level Plan Showing Estimated Gold in Blocks

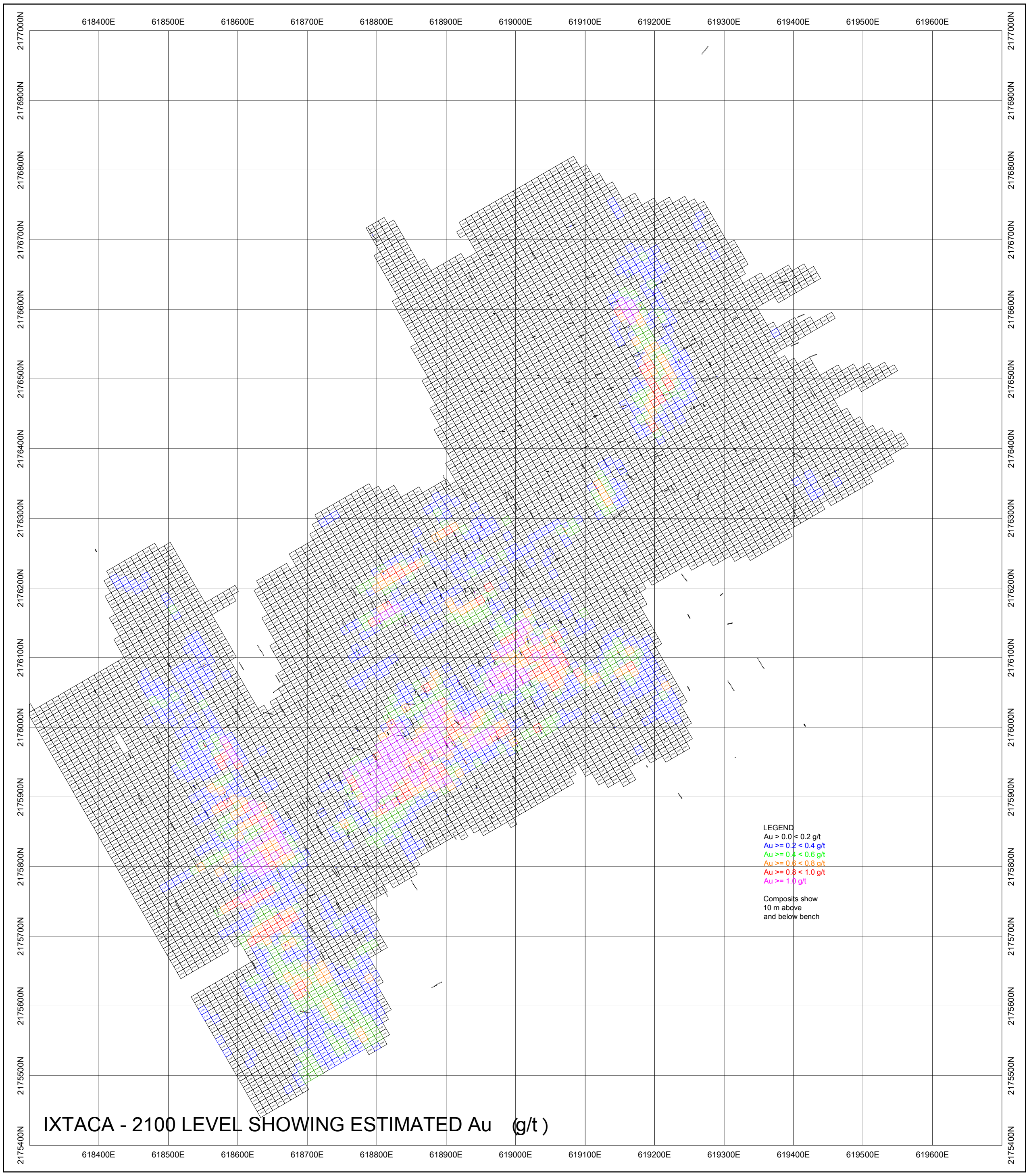


Figure 14-8 Ixtaca 2100 Level Plan Showing Estimated Gold in Blocks

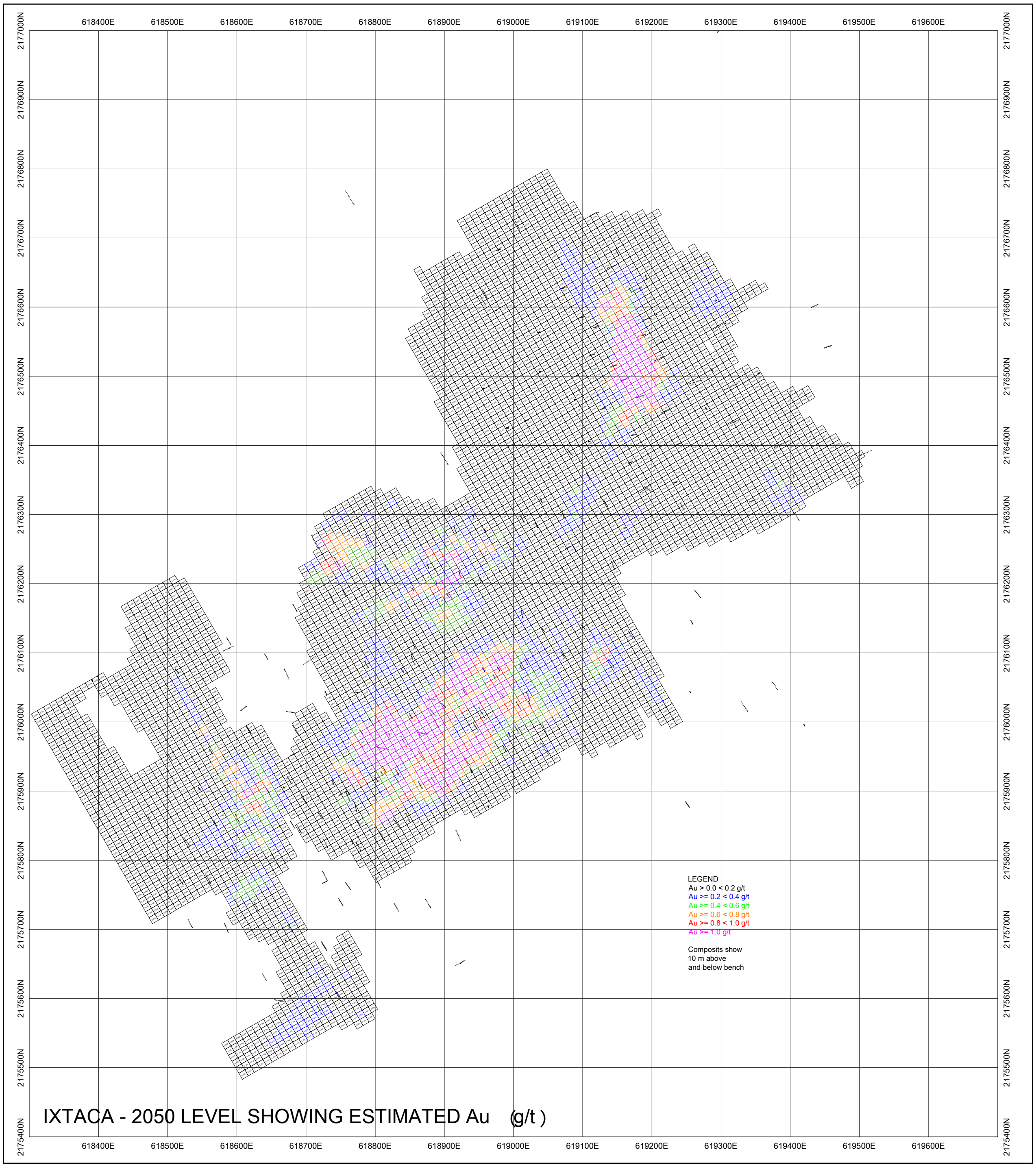


Figure 14-9 Ixtaca 2050 Level Plan Showing Estimated Gold in Blocks

15 MINERAL RESERVE ESTIMATES

No mineral reserve estimate has been completed on the Ixtaca deposit. This PEA study is conceptual in nature and includes Inferred Resources.

The CIM definition of a Mineral Reserve is that it is "the economically mineable part of a Measured or Indicated Mineral Resource demonstrated by at least a Preliminary Feasibility Study." A PFS has not been completed on the Ixtaca deposit and therefore it is not possible to declare a Mineral Reserve of any kind.

16 MINING METHOD

A Scoping level mine design, production schedule, and associated cost model have been developed for the Ixtaca Gold-Silver Deposit of the Tuligtic Property (hereafter referred to as “Ixtaca” or the “Project”).

This current work is based on the results of the January 22, 2014 model resource update and optimization work as a result of the option to purchase the Rock Creek Mill. Pit phases are designed using the results of an economic pit limit analysis. A Waste/mill feed cut-off grade (COG) of $20/t net smelter return (NSR) has been selected based on a premium to the break even cut-off grade (COG) of $14/tonne.

For this section the unit “t” refers to metric tonnes.

All classes of the resources are considered as mill feed in the mine planning production schedule. To help ensure that higher grade areas are targeted sooner in the mining schedule, the pit is divided into smaller phases. The initial phase targets the higher revenue near surface, higher grade areas of the ultimate pit. The total Ixtaca mill feed resource is shown in the Table below (the break-down of resource by class is shown in Chapter 1).

Table 16-1 Summarized Mill Feed

In-Situ In-pit Resources NSR($/t) ≥ 20						
PIT (i=incremental)	Mill Feed kT	NSR ($/t)	Au g/t	Ag g/t	Waste kT	Strip Ratio t:t
TOTAL	35,515	$42.82	0.76	47.49	178,807*	5.0**

**The waste includes 13 million tonnes of stockpiled material that is not processed. Average grade of stockpile material is 0.31g/t Au and 45g/t Ag.*
*** The strip ratio includes the stockpiled material as waste. If this material were processed, the strip ratio would be 3.4*

1,093 kT of the mill feed consists of Inferred resources (3%). The reader is cautioned that Inferred Resources are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral reserves, and there is no certainty that Inferred Resources will ever be upgraded to a higher category. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

16.1 Introduction

The objective of this updated PEA is to show the impact of significantly reduced initial capital cost on project economics and to demonstrate the viability of a mine plan which focuses on the near surface high grade limestone hosted portions of the Ixtaca Zone deposit. This mine plan is a smaller high grade scenario that uses updated technical and economic assumptions..

The mine planning work for this study is based on the 3D block model (3DBM) received from GCL on January 15, 2014. All mine-planning work is done with MineSight® (MineSight) including pit optimization, detailed designs and production scheduling with MineSight Strategic Planner (MSSP).

In addition to the information contained in the block model, other data used for the mine planning includes the base economic parameters, mining cost data estimated by MMTS based on other similar projects, recommended preliminary pit slope angles (PSAs) and tailings design by KP, estimated metallurgical recoveries (Blue Coast Laboratory), plant costs, and throughput rate.

16.2 Mining Datum

The project design work is based on NAD83 ZONE 14 N (meters). Topography (1m contours) provided by Almaden is based on a survey done by PhotoSat using WorldView2 satellite (50cm resolution, stereo). The 3D block model was provided by GCL on January 15, 2014 which was imported into MineSight.

16.3 Production Rate Consideration

The production rate for the project is determined by the Rock Creek Mill parameters. The mining schedule using a stockpile strategy for this Ixtaca study has an average mill throughput of 7,500 tonnes per day; resulting in a project mine life of 13 years of production.

16.4 Mine Planning 3d Block Model and MineSight Project

A 3D Block Model received from GCL on January 15, 2014 is used for this study. The resource model is a rotated 3D block model (3DBM) with whole block and mineralized Au (g/t), Ag (g/t) grades, ORE%, specific gravity and Class. Whole block Pb (%) and Zn (%) and Acid Rock Drainage (ARD) data grades are also included in the block model. Lithological grades for Au (g/t) and Ag (g/t) are also included in the block model and are the grade items used for this study. The lithological domains provided by GCL are grouped into metallurgical domains show in Table 16-2. MMTS added a topography (TOPO) item representing the percentage of a block below the topography surface.

Table 16-2 Block Model Domains

GCL Zone	GCL Name	Name	Metallurgical Domain	MMTS Zone #
1	ASH	Clay altered tuff	Volcanics	1
2	MHG	Main Ixtaca High Grade	Limestone	2
3	LGLM	Low Grade Main Limestone	Limestone	2
4	LGSH	Low Grade Main Shale	Shale	3
5	NEHG	North-east High Grade	Limestone	2
6	NELGSH	North-east Low Grade Shale	Shale	3
7	WASTE	Waste	N/A	N/A

The model dimensions are shown in Table 16-3. Mine planning pit designs and scheduling utilize 10m benches (1 bench = 2 block height). This 10m bench height represents a suitable bench height for the size of equipment chosen. The 10m x 10m horizontal dimensions provide a suitable resolution for long range planning.

The block model is horizontally rotated 30° counter-clockwise to line up with drill sections and with the orientation of the main mineralized structures.

Table 16-3 Ixtaca 3D Block Model Limits

	Min	Max	Block Size	# of Blocks
x	618418	620838	10	242
y	2174535	2176695	10	216
z	1590	2600	5	202

Table 16-4 Block Model Rotation Parameters

Origin		Angles	
Easting	618418	Horizontal	-30
Northing	2174535	Dip	0
Elevation	0	Plunge	0

A list of the lithological zones is given in Table 16-5. The total model area is illustrated in Figure 16-1

Table 16-5 Lithological Zones

Zone	Lithology
1	Volcanics (ash, tuff)
2	Main high-grade limestone
3	Low-grade Limestone
4	Low-grade Shale
5	NE extension high-grade limestone
6	NE extension low-grade shale
7	Waste

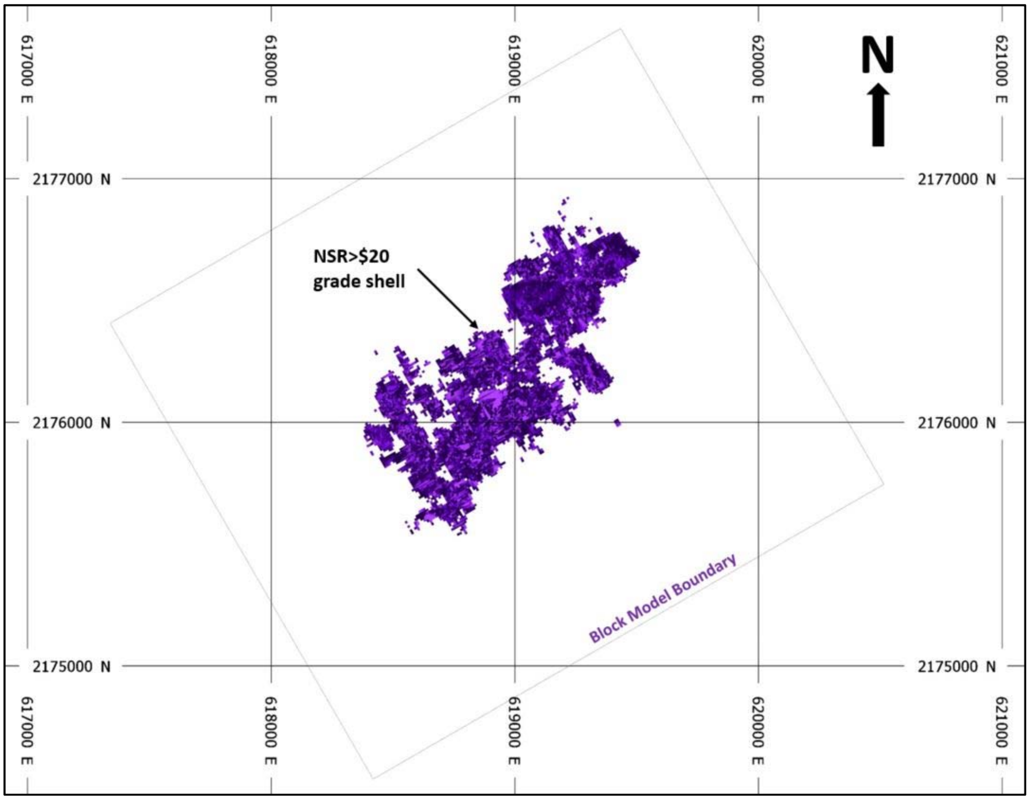


Figure 16-1 Ixtaca Resource Area with 10m Contours

16.5 Net Smelter Return (NSR)

NSR values ($/t) are calculated for each mineralized block in the resource model using Base Case Net Smelter Prices (NSP), process recoveries and the grade of each metal for each lithologic unit in the block. The abbreviation NSP is used in this report to differentiate between Market prices and Net prices (net of smelting, refining, and offsite charges) where market price is the basis of scoping studies and is often used to compare to other studies. NSP is based on the market price but applies the stated smelter and refining terms to arrive at an internal price value used through the analysis to generate value based resource tonnages and revenues in cash flow analysis. The NSP can be considered the price available at the mine gate to generate revenues to be applied against mining, processing, and G&A costs for the operation.

By using the applicable NSP with the metal grades and recoveries in each block, an NSR is calculated for each domain, giving a value in $/t for the material. Mill feed and waste cut-offs based on the domain NSR values are used for break-even material selection and for the grade bins for cash flow optimization in the production schedule. The metal prices and resultant NSPs used are based on a combination of recent spot prices and current common peer usage and are shown in Table 16-6.

Table 16-6 Metal Prices and NSP used for Ultimate Pit Selection

	Metal Price ($/oz)	NSP ($/oz)	NSP ($/gm)
Au	$1,150	$1,137	$36.6
Ag	$16	$14.2	$0.46

The PEA Update includes the Rock Creek process plant to produce gold and silver doré on site. The process plant includes conventional crushing, grinding, gravity, flotation, and concentrate leaching. The overall process recoveries for gold and silver in each metallurgical domain is shown in Table 16-7.

Table 16-7 Process Recoveries for NSR coding

Metallurgical Domain	Gold Overall Process Recovery	Silver Overall Process Recovery
Volcanics	50%	90%
Limestone	90%	90%
Black Shale	50%	90%

NSR is calculated as follows:

NSR =(NSPAu * Au(g/t) * AuRec) + (NSPAg * Ag(g/t) * AgRec).

Where:

- NSPAu = net smelter price for gold ($/g)
- NSPAg = net smelter price for silver ($/g)
- Au = gold grade (g/t) of metallurgical domain 1-3
- Ag = silver grade (g/t) of metallurgical domain 1-3
- AuRec = gold processing recovery(%)
- AgRec = silver processing recovery (%)

16.6 Mining Loss and Dilution

The pit-delineated resources used for scheduling are calculated from in-situ multi-zone grades in the 3DBM using detailed pit designs with the appropriate mining recoveries and dilutions applied. The recoveries and dilutions convert the in-situ mill feed tonnages and grades into a ROM delivered tonnage and grades to the mill. The ROM delivered tonnage (i.e. what the mill will actually "see") is used to determine the appropriate production schedule. The following describes the method used to estimate mill feed loss and dilution resulting from the mining process.

There are three main parts to mining loss and dilution:

- Dilution of waste into mill feed along the selective mining boundary
- Loss of mill feed into waste along the selective mining boundary;
- General mining losses and dilution due to handling (haul back in truck boxes, stockpile floor losses, etc.)

The estimated block grade includes some internal dilution, and an additional external mining dilution of 3% is applied to in-pit resource estimates based on selective mining techniques.

Overall mining loss is assumed to be 3%. This is an allowance to cover mill feed material that gets misdirected during material handling.

Mineralization does not strictly follow the hard boundaries of the domains, therefore the dilution material will have some grade to it. Dilution can also be comprised of material that is slightly below the cut-off grade boundary and therefore has mineralization. The grade of dilution material for each domain is shown in Table 16-8 below.

Table 16-8 Ixtaca Dilution Grades by Domain

Metallurgical	Dilution Grade		
Domain	NSR	AU	AG
	($/t)	g/t	g/t
Volcanics	8	0.32	5.7
Limestone	8	0.12	9.5
Black Shale	8	0.15	11.7

16.7 Economic Pit Limits and Pit Designs

Economic pit limits for the Ixtaca deposit have been determined for this study with a Lerchs-Grossman pit optimization using MineSight Economic Planner (MS-EP). Sensitivity to metal price, mine costs, and processing cost, are included in this analysis.

16.7.1 Pit Optimization Method

The LG assessment is carried out by generating sets of pit shells of varying revenue assumptions and pit slopes to test the deposits' geometric/topographic and pit slope sensitivity. For this PEA study, Measured, Indicated and Inferred (MI & I) class resources are included in the LG economics.

16.7.2 Economic Pit Limit Assessment

This section describes basis for mining and processing costs used in the LG Analysis.

16.7.2.1 LG Pit – Unit Mining Cost

Mining unit costs to generate the LG pit shells are based on the MMTS database for actual operating costs from similar operations in Mexico and scaled up to reflect smaller sized mining equipment compared to previous scoping studies. Mining costs include fuel, tires, maintenance parts and labour and operator labour costs.

The mining unit cost used for the pit optimization is shown Table 16-9 below.

16.7.2.2 LG Pit – Processing Operating Cost

The processing operating cost is estimated from benchmarks of similar processing operating plants, including operations located in Mexico, and adjusted to reflect local electrical energy cost, and labor cost.

The average unit processing costs per tonne milled used for the pit optimization are shown in Table 16-9.

Table 16-9 Ixtaca Unit Costs

	Unit Cost - $/tonne
Mining	$2.20
Processing	$14

16.7.3 Pit Slope Angles

Maximum Pit Slope Angles (PSAs) are based on recommendations from KP.

KP has recommended varying the maximum inter-ramp-angles (IRA) by specific material zones delineated in the pit area as well as wall dip direction. The resultant overall pit slope angle considers the maximum IRA for each material zone and includes flatter upper slopes, haul ramps and/or wider benches. Table 16-10 summarizes pit slope assumptions.

Table 16-10 Ixtaca Pit Slope Assumptions for LG Pits

Wall Dip Direction (degrees)	Overall Slope Angle (degrees)
000-020	45
021-060	41
061-359	45

16.7.4 Process Recoveries

The LG runs use the calculated NSR values for each block. Recommended process recoveries described in Section 13 are varied by lithology domain.

16.7.5 LG Economic Pit Limits

The ultimate economic pit limit is estimated as the pit size where an incremental increase in pit size does not significantly increase the pit-delineated resource; in other words, where the expansion of the pit shell has limited potential for a positive economic margin. The selected (undiscounted) ultimate pit limit is chosen where the incrementally larger pits produce marginal or negative economic returns.

A series of LG Pit surfaces are created to assess the incremental economics of increasing the mining limits. By varying the metal prices from low to high values, the geometry of the mineralized deposit is tested, where low metal prices require high grades and/or low strip ratios to generate an economic pit shape, and high metal prices can generate incremental revenues to mine deeper, higher strip ratio material or lower grade zones. The larger pit shapes create larger mineable resources capable of supporting larger capital expenditure, but the extra material has lower economic margins (revenues minus cost) where-as the smaller pit shapes have higher margins but create smaller projects and can be more capital sensitive. Note: This is a not price sensitivity study since all in-pit resource tonnages are calculated at the Base Case metal price and corresponding NSR cut-off grade.

Metal prices are adjusted upwards and downwards in 10% increments from 50% to 150% to generate a series of LG shells. Potential mill feed tonnes inside each LG shell are calculated using a constant NSR cut-off of $14/tonne. The Ixtaca LG pit series are shown graphically in Figure 16-2.

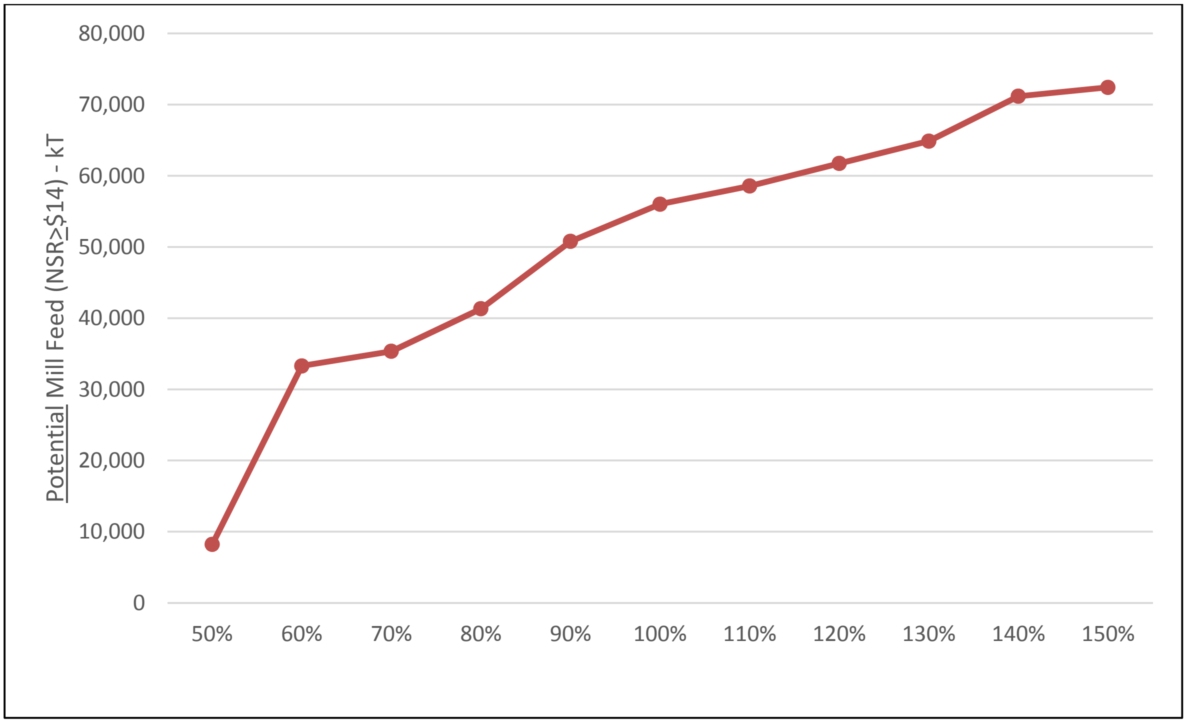


Figure 16-2 LG Sensitivity Summary (NSR≥$14/t)

The major inflection point is at 60% with a secondary one at 90%. The secondary inflection point (90%) is chosen as the basis for the ultimate pit design.

See Figure 16-3, Figure 16-4 and Figure 16-5 for a plan view and representative sectional views.

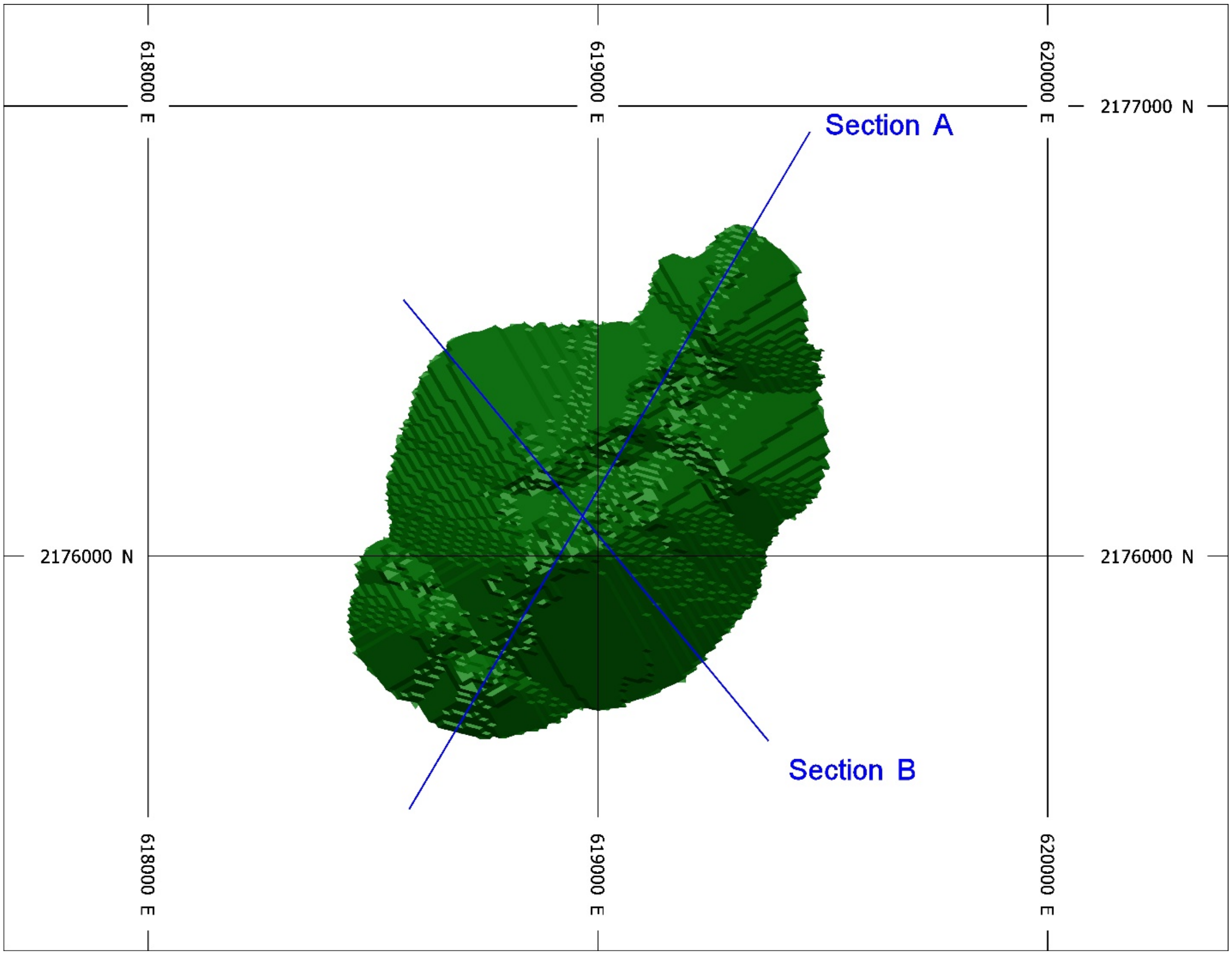


Figure 16-3 Plan View of LG shell

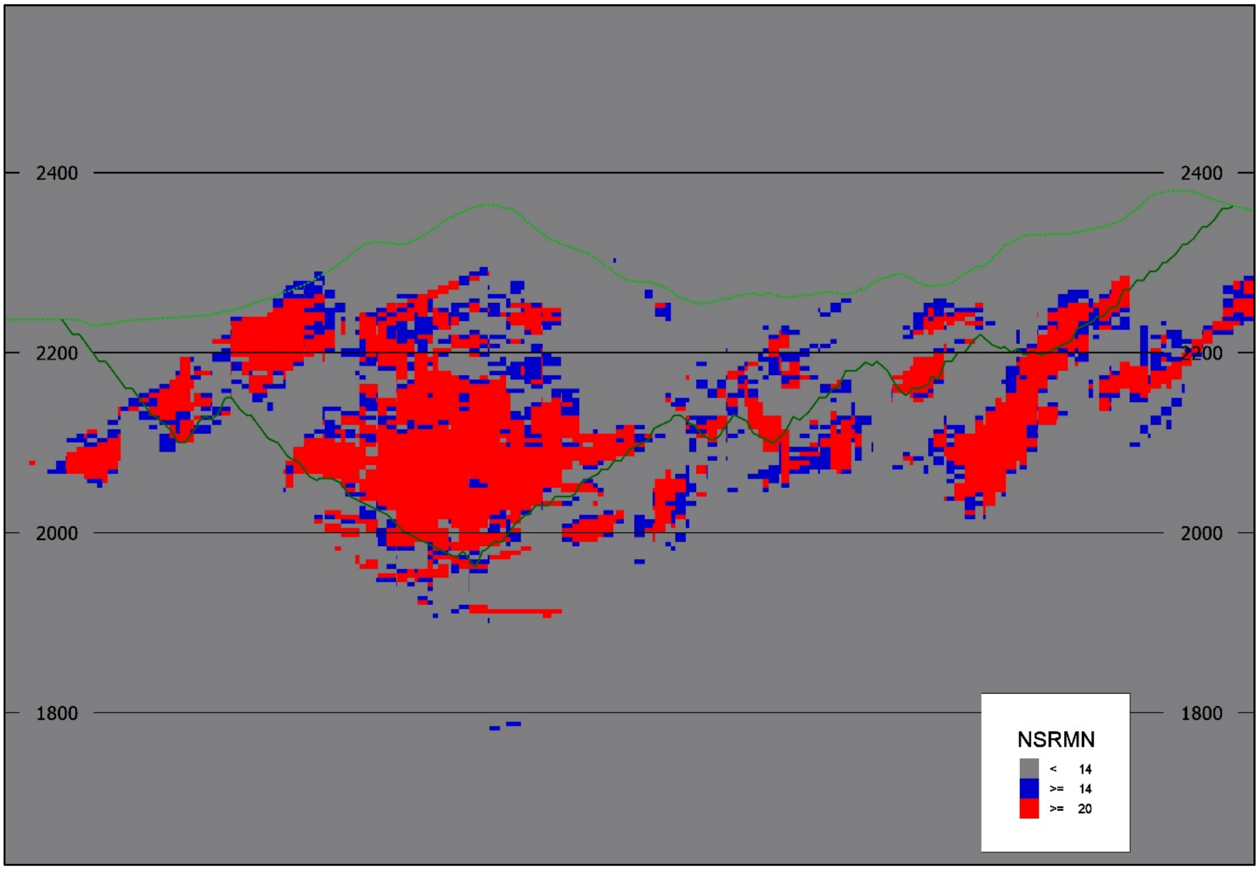


Figure 16-4 Section A (looking North-West)

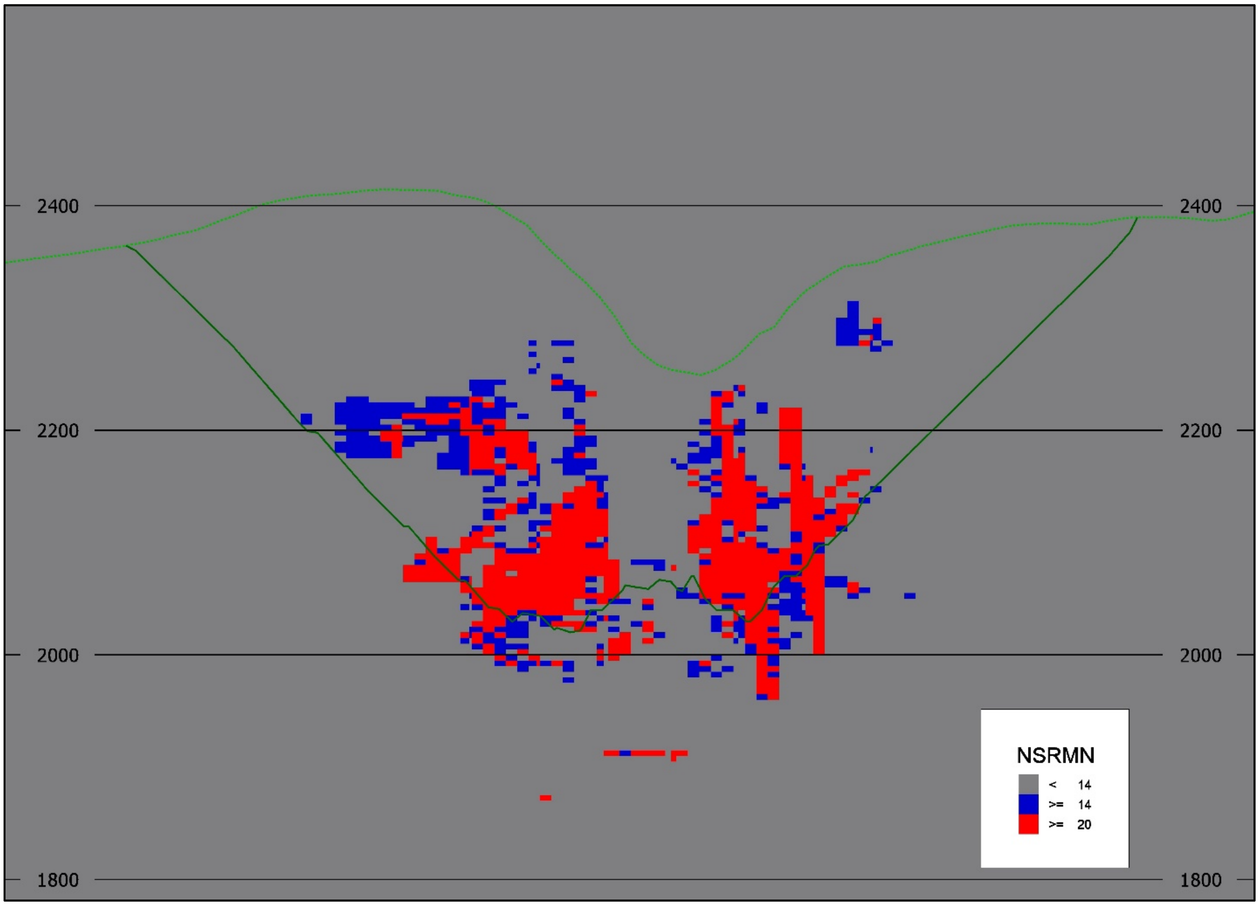


Figure 16-5 Section B (looking North-East)

The 90% LG shell is selected as a guide for the ultimate pit design. It should be noted the 90% incremental LG pit shell will still generate positive cash flow at metal prices lower than the prices used in the MSEP analysis. Selecting this LG shell for the ultimate pit design ensures that the incremental pit shell produces a positive cash flow at metal prices lower that the pit optimization assumptions. The potential mill feed tonnes reported inside each LG shell use the incremental break-even cut-off of NSR≥\$14/t (the expected process cost).

Cost and slope sensitivity are analysed to determine how these factors may affect the ultimate economic pit limit. Series of LG runs analyzed varying the metal prices, mining cost, and processing cost\. Figure 16-6 summarizes the mill tonnes sensitivity series.

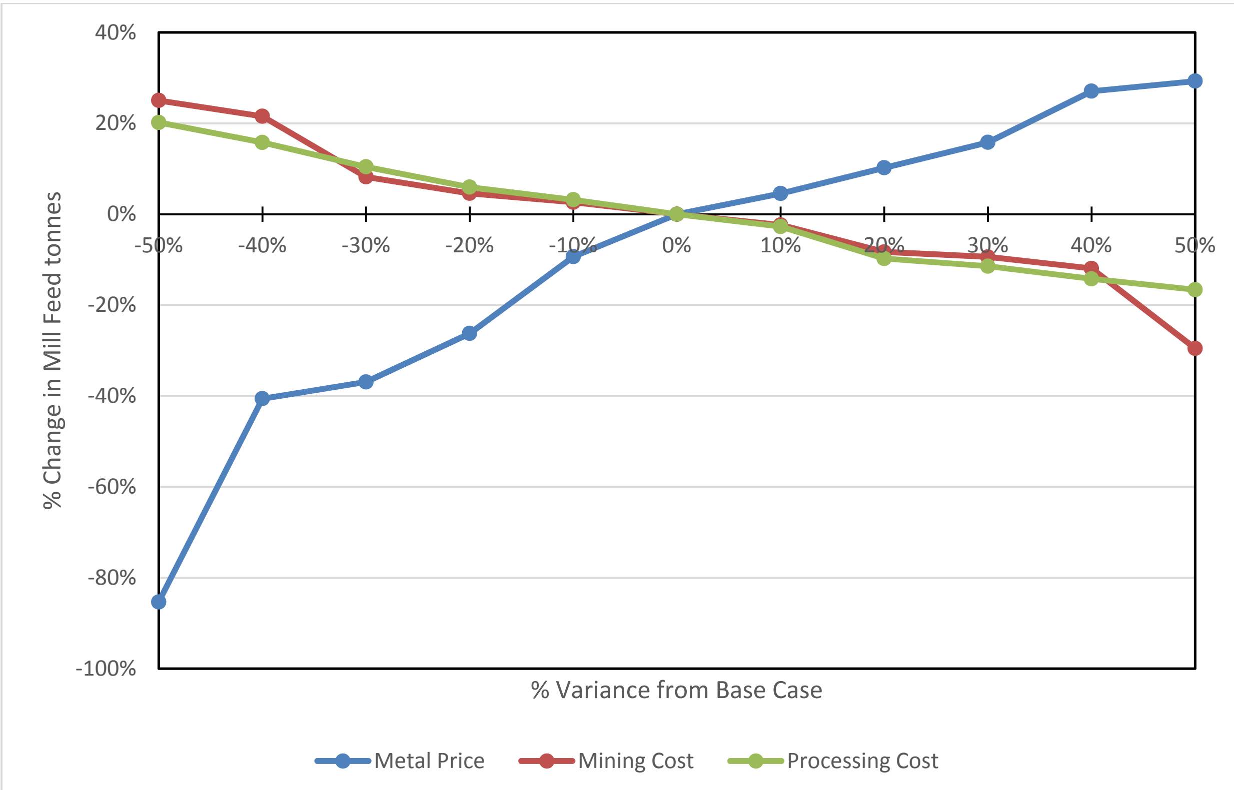


Figure 16-6 Potential Mill Feed Sensitivity

The sensitivity analysis shows that economic pit limit size is most sensitive to metal price. The economic pit limit size is least sensitive to changes in mining or processing costs.

16.7.6 Detailed Pit Design

Detailed pit phase designs have been completed to demonstrate the viability of accessing and mining the potentially economic resources at the Ixtaca site. Breaking the ultimate pit into smaller phases allows a smoother progression of waste stripping and targeting of higher grade mill feed tonnes earlier in the schedule. The designs are developed using MineSight software, provided geotechnical parameters, suitable road widths for the chosen equipment size, and minimum mining widths based on efficient operation of the mining equipment chosen for the Project.

16.7.6.1 Haul Road Width

Haul road widths are designed to provide safe, efficient haulage, with the following minimum width specifications:

- For dual lane traffic, a travel width of not less than three times the width of the widest haulage vehicle used on the road is required.
- Where single lane traffic exists, a travel width of not less than two times the width of the widest haulage vehicle used on the road is required.

- Shoulder barriers should be at least three-quarters of the height of the largest tire on any vehicle hauling on the road along the edge of the haulage road wherever a drop-off greater than 3.2m exists. The shoulder barriers are designed at 34° face slope, which is slightly less than the angle of repose. The width of the barrier must be added to the travel width to get the total road width.

Ditches are included within the travel width allowance. For crowned haul roads, the width of this ditch allowance is 5m. Ditches are not added to the in-pit high wall roads; there is adequate water drainage at the edge of the road between the crowned surface and lateral embankments, such as high walls or lateral impact berms. During run-off, when water is flowing, this ditch allowance is still part of the available running surface if required, and can be used as lateral clearance for haul trucks. It can also be driven on, if required, to avoid obstructions. In practice, specifically-designed excavated ditches in haul roads tend to be filled in by road grading and, when maintained as open ditches, can create a hazard if the wheel of a haul truck or light vehicle should happen to get caught in them. Avoiding the addition of ditch width to the three-truck travel width on the in-pit high wall roads can significantly reduce the pit waste stripping.

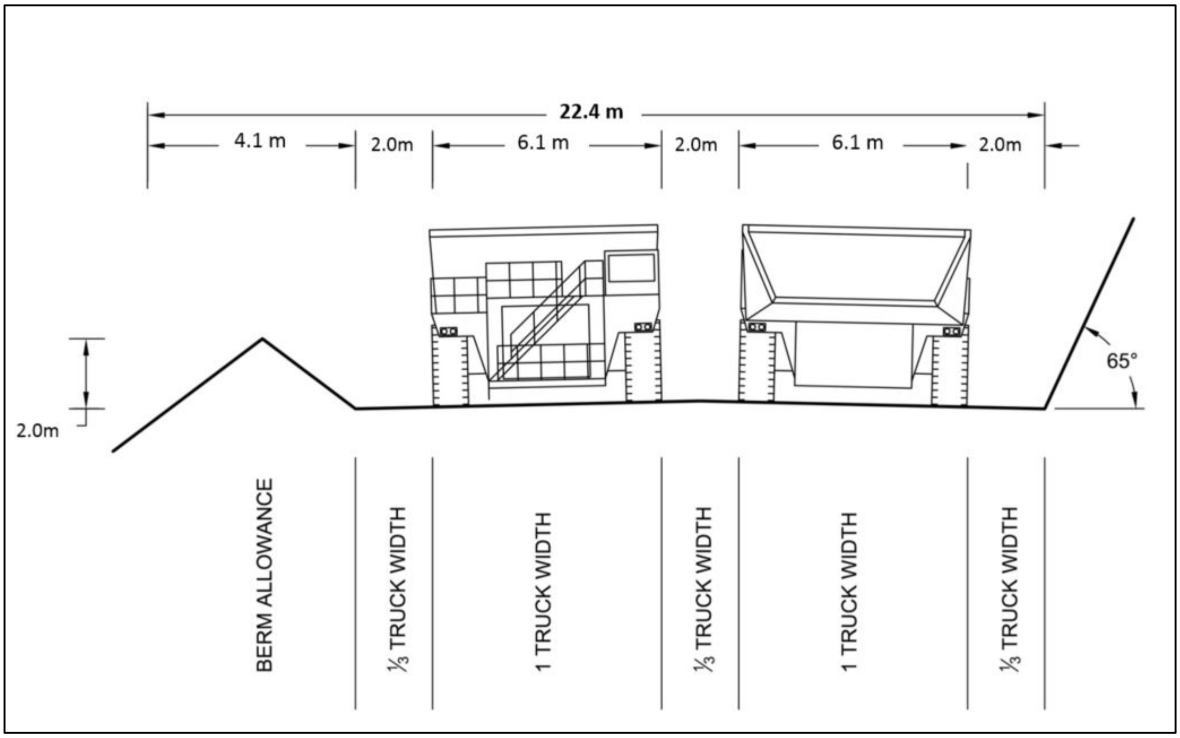


Figure 16-7 Dual Lane High Wall Road Cross Section

The haul road widths and cut slope geometries outlined above may or may not be suitable for external haul roads placed on steep side slopes where significant rock cuts and fills are required. These need to be evaluated on a site-by-site basis to accommodate the geology and geometry of the road alignment. The design parameters outlined above (road width, cut slope angles, heights between benches, etc.) are suitable for this level study and will need to be assessed in higher level studies, with regards to the quality of the rock and the geologic structure in the area where roads exit the pit.

16.7.6.2 Pit Design Parameters

Pit slope design parameters are based on PFS level geotechnical pit slope design reported by KP in July 2015 following a geotechnical site investigation program completed in 2014 to collect geomechanical and hydrogeological information. The pit slope parameters used for the Ixtaca pit phase designs are summarized in the following two tables.

Table 16-11 Pit Slope Design Parameters

Domain	Wall Dip Direction	Bench Face Angle (degrees)	Berm Width (m)	Inter-Ramp Angle (degrees)	Maximum Inter-Ramp Slope Height (m)	Overall Slope Angle (degrees)
Volcanic Tuff	000-045	65	10	46	200	43 to 45
	046-085	65	12	46	200	
	086-359	65	10	46	200	
Sedimentary Package	000-045	70	10	49	200	
	046-085	65	12	43	200	
	086-359	70	10	49	200	

**Note: The maximum height of these inter-ramp slopes should not exceed 200m. A 25m wide berm is included for geotechnical stability, where the vertical distance between high-wall ramps is greater than 200m.*

Table 16-12 Equipment Guidelines

Equipment Fleet **Major Mining Fleet**		
Shovels	$12m^3$ shovel	
Trucks	91tonne truck	
Maximum ramp grade		10%
Waste Dump Angle of Repose		37°
Largest Vehicle Overall Width		6.1m
Maximum Tire Height (27.00-R49)		2.7m
Minimum Haul road outside berm height		2.0m
Minimum Shoulder / Berm Width		4.1m
Double lane high-wall haul road allowance		22.4m
Single lane high-wall haul road allowance		16.3m

16.7.6.3 Minimum Mining Width

A minimum mining width for each pit phase is specified to maintain a suitable mining platform for efficient mining operations. This width is established based on equipment size and operating characteristics. For this study, the minimum mining width generally conforms to 35m, which provides sufficient room for 2-sided truck loading.

16.7.6.4 Access Considerations

Access considerations maintain that haul roads must have a travel surface at least twice the width of the widest haul vehicle (one-way roads) and at least three times the width of the widest vehicle (two-way roads). One-way roads are not normally employed for main long term haul routes because they limit the safe by-passing of trucks and consequently lead to reduced productivity. One-way roads are, however, an appropriate option for low volume traffic flow or shorter-term operations. For this report, the use of one-way haul roads is limited to the bottom two or three benches of pit phases. An access ramp is not designed for the last two benches of each pit bottom, assuming that temporary ramps will be used to access the pit bottom and will be removed upon retreat.

External and internal pit road grades are designed at a maximum grade of 10%. Switchbacks are designed flat, with ramps entering and exiting at design grade. In practice however, grades will be transitioned so that visibility and haul speeds are optimized going around the switchback.

16.7.6.5 Variable Berm Width

Pit designs for Ixtaca are designed honouring overall IRAs, a nominal bench face angle of 70° (except in volcanics where it is 65°) and a minimum safety berm width of 8m. Where the vertical distance between high-wall ramps is greater than 200m, a 25m wide berm is added for geotechnical stability (based on the guidelines provided by KP). Where haul roads intersect designed safety benches, the haul road width is counted towards the safety berm width.

16.7.6.6 Bench Height

Ixtaca pit designs are based on the digging reach of the shovels (10m operating bench) with double benching between high wall berms; therefore, the berms are separated vertically by 20m.

16.7.6.7 Pit Phase Selection

The ultimate pit limit is selected using the 90% Base Case metal prices case, based on pit optimization economics (see Section 16.7.2). Phase 1 is designed to target approximately two years of high grade mill feed at the lowest strip ratio. The Phase 2 mines out to the East and deeper, while Phase 3 mines to the final Eastern wall. Phase 4 mines to the final Western wall and ultimate pit bottom in the South part of the pit. Phase 5 is a final pushback to the North.

For most hard rock/metal deposits the optimal sequence of pit phases arises from mining the areas within the ultimate pit that have higher economic margins due to higher grades, lower strip ratio, or both. Phase 1 has the lowest strip ratio and highest economic return based on higher grades.

Backfilling waste into mined out sections of the pit can reduce mine waste haulage costs as well as reduce the area of disturbance compared to disposing waste rock in external dumps. Generally, with sequential pit phases, the third phase may partially backfill the mined out first phase, the fourth phase the mined out second phase and so on. For the Base Case mine plan, five pit phases are designed. Backfilling is only minimally available since the ultimate pit bottom is not reached until Phase 4 is mined out. At that point in time Phase 5 is mostly pre-stripped.

The designed Ixtaca pit phases are shown in Figure 16-8.

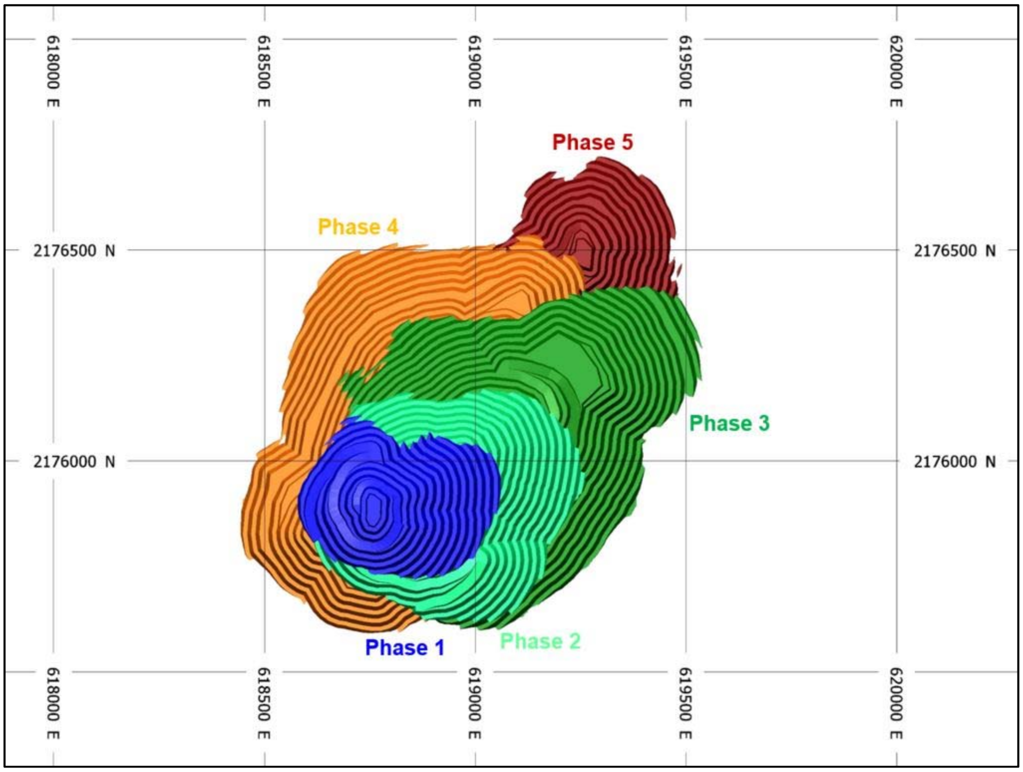


Figure 16-8 Plan View of all Ixtaca Pit Phases

16.8 Pit Resource

Ixtaca pit delineated resources (shown in Table 16-13) are calculated using a mining dilution of 3% and mining loss of 3%.

For breakeven economics it is assumed that low grade material will be mined with higher grade material within the economic LG pit shell. The Ixtaca incremental breakeven NSR COG is $14/tonne which covers the process operating costs. A cut-off grade of $20/tonne has been used to select mill feed for the production schedule.

Table 16-13 Summarized Pit Delineated Resource

In-situ Pit Resources and Diluted Grade NSR ≥ $20						
PIT (i=incremental)	Mill Feed kT	NSR ($/t)	Au g/t	Ag g/t	Waste kT	Strip Ratio t:t
TOTAL	35,515	$42.82	0.76	47.49	178,807*	5.0**

**The waste includes 13 million tonnes of stockpiled material that is not processed. Average grade of stockpile material is 0.31g/t Au and 45g/t Ag.*
*** The strip ratio includes the stockpiled material as waste. If this material were processed, the strip ratio would be 3.4*

16.9 Mine Plan

16.9.1 Mine Production Schedule

The mine production schedule is developed with MineSight Strategic Planner (MSSP), a long range schedule optimization tool for open pit mines. Annual production requirements, mine operating considerations, product prices, recoveries, destination capacities, equipment performance and operating costs are used to determine the optimal production schedule. Scheduling results are presented by period, as well as cumulatively. The production schedule includes:

- Tonnes and grade mined by period, broken down by mill feed and waste material type, bench, and mining phase;
- Truck and shovel requirements by period in number of units and operating hours;
- Tonnes transported by period to different destinations (mill, stockpiles, and rock storage facilities).

There is one year of pre-production mining (referred to as Year -1), first full year of operation is defined as Year 1. The mine schedule is done in annual time periods.

In the production scheduling, mining precedence is required to specify the mining order of the pit phases based on relative location of the phases. The primary program objective in each period is to maximize the Net Present Value (NPV). The MSSP NPV calculation is guided be an estimation of the operating and capital costs, process recoveries, and revenues based on the metal grades, prices, and recoveries. The pit phases have been designed with higher grades and lower strip ratios in the earlier phases and when this sequence is used by MSSP the project NPV is improved.

In addition to phase precedence, MSSP tracks the haul cycle time and resultant total haul truck hours from each pit and bench to the primary crusher, stockpiles, or designated rock storage facilities to determine the best sequence for each period. The optimal mining sequence is on that pursues the combined objectives of higher revenues earlier in the mine life with lower required equipment hours.

16.9.1.1 Schedule Criteria

The production schedule setup includes a large number of scheduling parameters, and can be modified to a high level of detail. As such, key scheduling parameters used in MSSP are defined here.

Truck and shovel criteria are a key component in the calculation of equipment hours in MSSP. Table 16-14 below lists the truck and shovel scheduling design parameters used in MSSP.

Table 16-14 Equipment Design Criteria

Shovel	Bucket size (m3)	12
	fill factor	90%
	payload (BCM)	8.0
	payload (tonnes)	21.2
Truck	size (m3)	60
	capacity (tonnes)	90
	fill factor	95%
	payload (BCM)	42.2
	# passes (BCM)	5.3
	# passes (tonnes)	4.2
	rounded	4
	Pass time (sec)	35
	Operator Eff (%)	80%
	spot & wait (sec)	30
	load time (min)	3.42
	Prod (tonnes/op hr)	**1489**
	Mt/year	9.1

The MS-SP schedule assumes 365 mine operating days scheduled per year and a 21.5 hour operating day. This 21.5 hour day includes a total daily delay time of 2.5 hours, resulting in a 90% factor.

Haulage destinations include the following;

- Crusher Plant– a location 0.3 km south-west of the pit rim is used for the crusher plant.
- Rock Storage Facilities – locations 1-3 are around the pit rim and are used for the majority (~62%) of the waste. The location around the TMF is used to store the remaining waste that does not fit near the pit limits.
- Tailings Embankments – the TMF is built with waste rock from the pit at a rate that stays ahead of tailings storage requirements.
- Stockpile – the stockpile location is chosen to be near the mill in order to keep the stockpile reclaim haulage distance to a minimum.

16.9.1.2 Cut-off Grade Strategy

MSSP optimizer can develop a COG strategy to increase the Project NPV by stockpiling lower grade marginal material for processing later in the LOM schedule. A COG strategy increases mill head grades and revenues early in the production schedule which generally has a positive impact on project economics. For the mining method implemented for this deposit, it is assumed that blast-hole assaying will be used for grade control to define mill feed COG limits in the pits.

16.9.1.3 Schedule Results

The primary scheduling objective in each period is to maximize the NPV. The MSSP NPV calculation is guided by an estimation of operating and capital costs, process recoveries, and metal prices. Since metal prices are kept constant throughout the mining schedule the best solution in each period is one that has the lowest cost and highest grade material fed to the mill.

The summarized results for the production schedule is shown in Table 16-15. The summarized results for the mill feed production schedule by ore type is shown in Figure 16-9 with combined mill feed grades summarized in Figure 16-10.

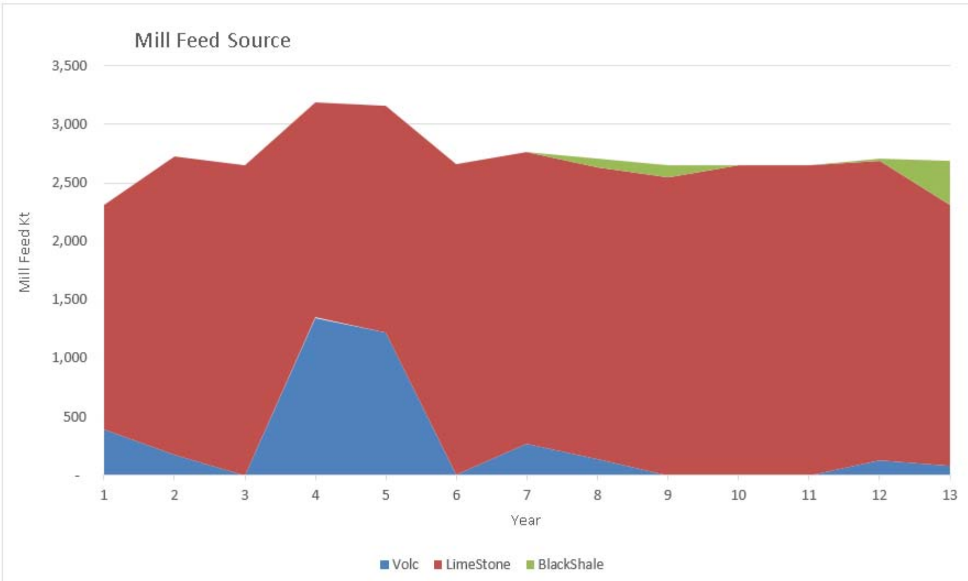


Figure 16-9 Summarized Mill Feed Schedule by ore type

Mill throughput rate for volcanics material is up to 50% higher than Limestone or Black Shale. As such, the total yearly mill feed is dependent on the ratio of volcanics material planned for processing and will vary slightly each year.

Figure 16-10 Mill Feed Grades

Table 16-15 LOM Production Schedule

Year		-1	1	2	3	4	5	6	7	8	9	10	11	12	13	Totals
Waste	kT	12,043	15,220	15,387	14,528	20,742	15,311	21,048	19,383	15,920	5,862	346	4,395	4,168	1,049	165,401
Pit to Mill	kT	-	2,316	2,696	2,650	3,164	3,129	2,659	808	2,707	2,650	1,663	91	860	1,168	26,561
Stockpile to Mill	kT	-	-	27	0	32	32	-	1,955	-	-	987	2,559	1,845	1,518	8,954
Total Mill Feed	kT	-	2,316	2,723	2,650	3,196	3,161	2,659	2,763	2,707	2,650	2,650	2,650	2,705	2,686	35,515
Pit to Stockpile	kT	-	1,954	3,032	1,822	41	3,078	3,445	1,461	4,393	2,237	253	16	546	83	22,360
Au	g/t		0.74	0.68	0.97	0.96	0.97	1.08	0.59	0.76	0.88	0.90	0.41	0.44	0.40	0.76
Ag	g/t		57.50	50.07	63.27	38.48	42.64	69.27	31.45	47.01	60.21	54.72	31.35	37.43	38.95	47.49
Total Material Mined	kT	12,043	19,489	21,114	19,000	23,946	21,518	27,152	21,652	23,019	10,749	2,262	4,501	5,574	2,301	214,321
Total Material Moved	kT	12,043	19,489	21,141	19,000	23,978	21,550	27,152	23,608	23,019	10,749	3,249	7,060	7,419	3,819	223,275

16.9.2 Rock Storage Facilities (RSF)

The specific gravity for waste rock averages 2.0 t/m^3 based on the ratio of less dense volcanic material to higher density hard rock (limestone and black shale). The specific gravity for volcanic material is 1.67 t/m^3 while the rest of the material has an SG value of 2.65 t/m^3. The Ixtaca mine plan requires total blasted waste rock storage of 165 million tonnes or 111 million cubic meters (a 35% swell factor is applied to in-situ volume).

Geochemical characterization of site materials has confirmed that waste rock is not expected to be net acid producing.

16.9.2.1 RSF Design Parameters

The RSFs are placed in locations around the ultimate pit (where space permits) in order to reduce the haul distance. The remaining material is hauled to a location downstream of the TMF. The dump face angle is set to 37 degrees (typical angle of repose) except for the RSF north of the ultimate pit where the dump face angle is reduced to 26 degrees. Typical RSF construction will involve building from the bottom-up in lifts less than 100m high.

Figure 16-11 below is a plan view showing the destinations used for waste rock haul cycles.

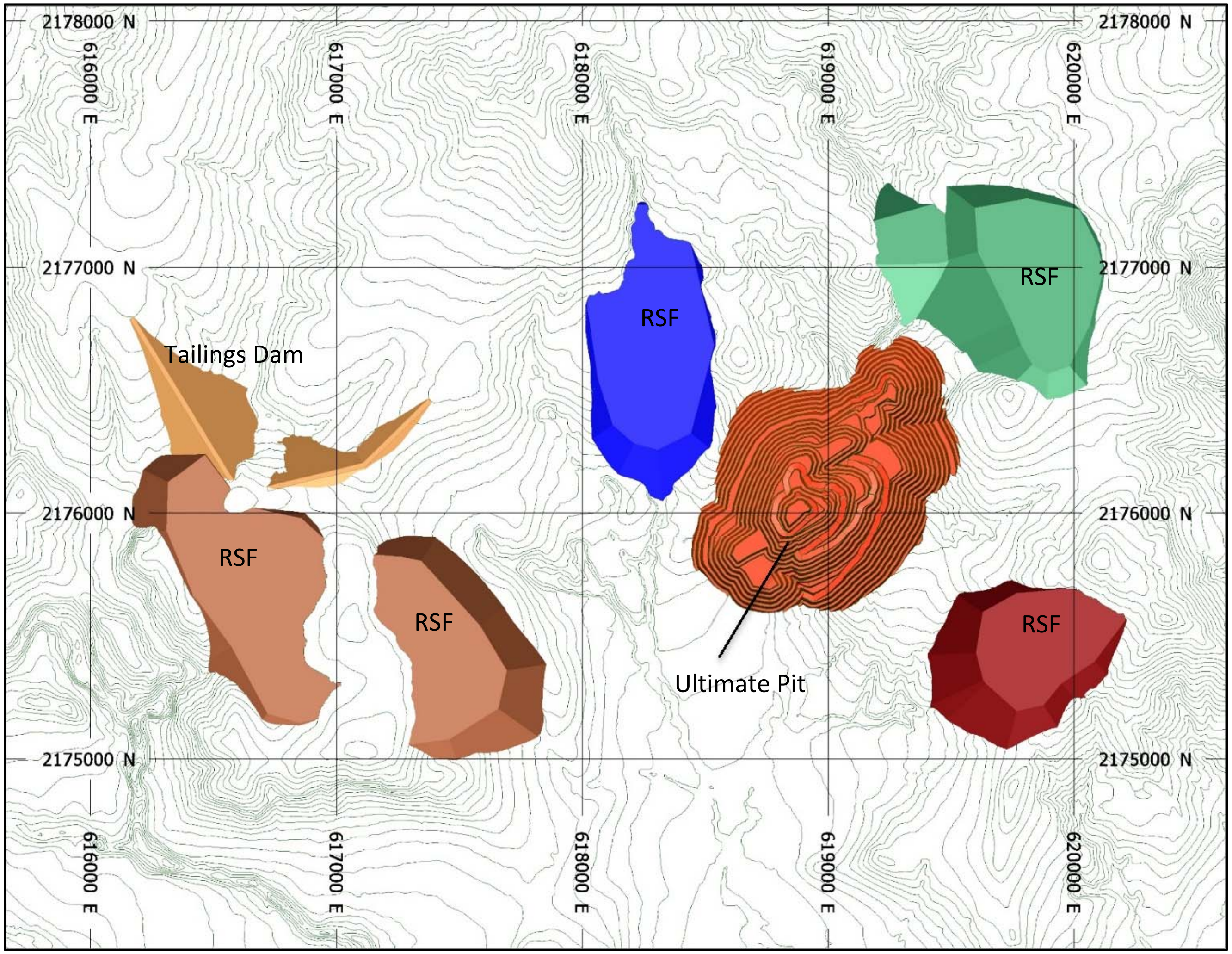


Figure 16-11 Plan View of RSF Locations and Ultimate Pit

16.9.3 Mine Production Detail

The mining schedule includes one year of pre-production mining (pre-stripping), followed by 13 years of mill feed production.

All waste rock is directed to the RSFs or the tailings embankment. The waste rock volume is comprised of approximately 66% volcanic and 34% primary rock material.

All stockpiled material is directed to a temporary stockpile location south of the pit and east of the mill.

A variable COG grade strategy consists of using stockpiles in the early years to store low and mid-grade mill feed.

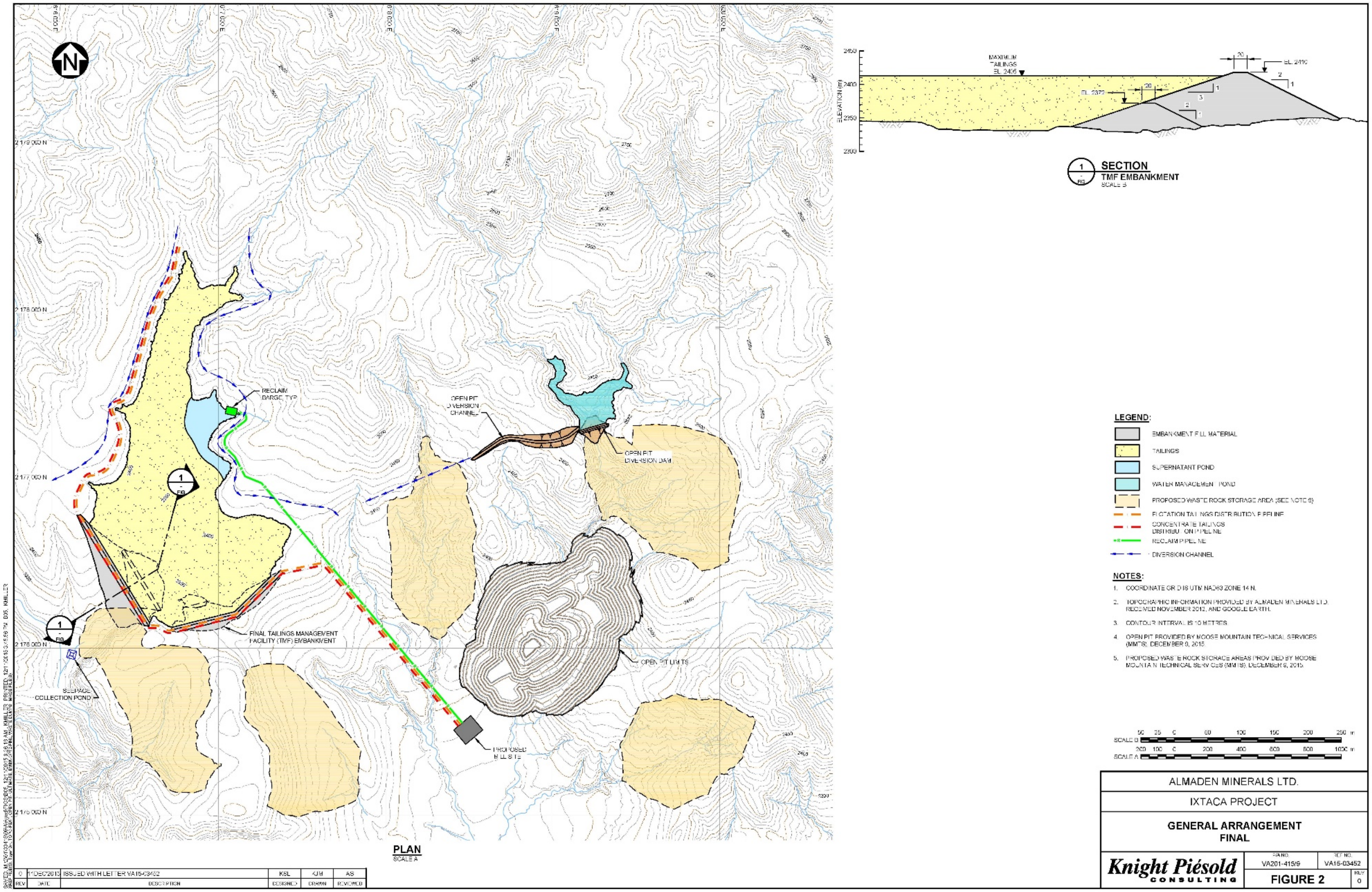


Figure 16-12 Life Of Mine General Arrangement

16.9.4 Mine Operations

16.9.4.1 General Organization

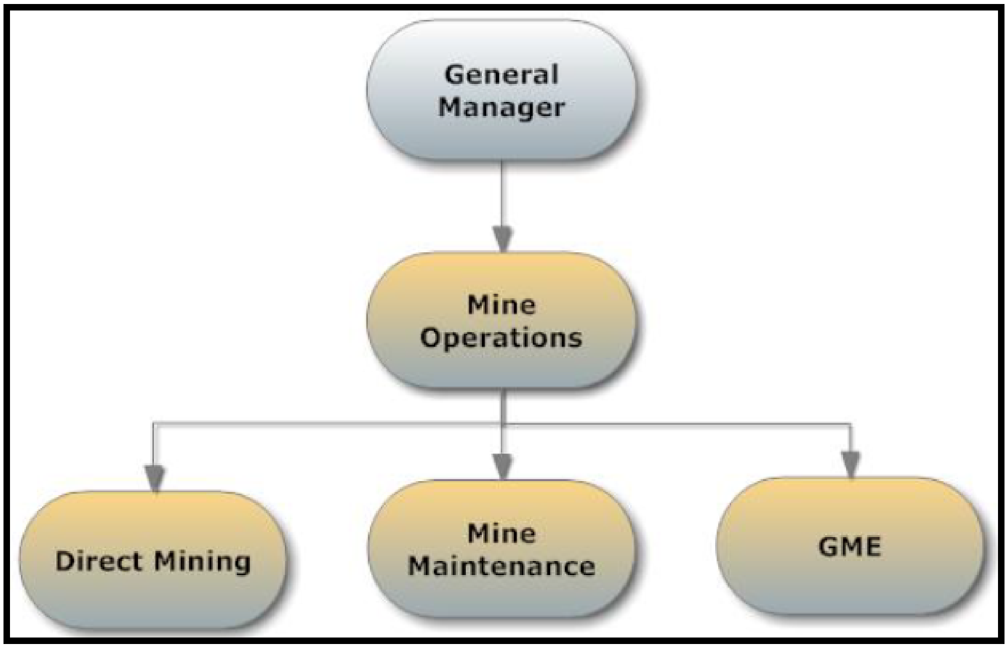


Figure 16-13 General Organization Chart

Mine operations are organized into three departments: mine maintenance, direct mining, and technical services. Other areas of the organization are dealt with elsewhere in the report. The mine department is estimated to employ 431 people initially (including temporary employees).

The mine maintenance department reports to the General Manager through the Maintenance Manager. Under the supervision of the General Maintenance Foreman, mine maintenance accounts for supervision, planning, and implementation of all maintenance activities pertaining to the mine fleet or direct mining infrastructure, whether in the maintenance shops or in active mining areas.

The direct mining and technical services departments will report to the General Manager through the Mine Manager. Direct mining, under the supervision of the General Operations Foreman, accounts for supervision, training, and implementation of all drilling, blasting, loading, hauling, and pit maintenance activities in the mine. It also accounts for any other areas where mine fleet activity is present, such as the construction of haul roads. Technical services, under the supervision of the Chief Engineer, account for all technical support from mine planning, geology, surveying and mine engineering personnel.

In this study, direct mining and mine maintenance is planned as contractor owned and operated fleet/personnel. The project owner is responsible for supplying all necessary infrastructures for maintenance. All facilities required for the blasting supply contractor will be purchased by the Owner as well. The mine will employ a drilling and blasting foreman that will act as a liaison between the blasting contractor and the mine, and a drilling and blasting engineer to design and manage the blasting operations.

16.9.4.2 Drilling

Areas will be prepared on the bench floor for blast patterns in the in situ rock. The spacing and burden between blast holes will be varied as required to meet the specified powder factor for the various rock types.

If future operations decide to install automatic samplers, the drill will be responsible for bagging and tagging the drill cutting from the sampler for shipment to the assay lab. If manual sampling is done, the driller will be responsible for taking the samples from the drill cuttings, and bagging and tagging it.

Controlled blasting techniques will be used for high wall rows, pioneering drilling during pre-production, and development of initial upper benches. Where required, dozers will be used to establish initial drilling benches for the upper portions of each phase and move material until sufficient mining width is established.

16.9.4.3 Blasting

A blasting study has been done with a targeted top-size of approximately 1100mm for barren rock and quarried rock. A powder factor of 0.13 kg/t is used for volcanics while a powder factor of 0.22 kg/t is used for limestone and black shale material.

16.9.4.4 Explosives

A contract explosives supplier will provide the blasting materials and technology for the mine, as well as manufacture bulk explosives on site. The nature of the business relationship between the explosives supplier and the mining operator will determine who is responsible for obtaining the various manufacture, storage and transportation permits, as well as any necessary licenses for blasting operations. This will be established during commercial negotiations. For this study, the explosives contractor delivers the prescribed explosives to the blast holes and supplies all blasting accessories. Blasting accessories will be stored in magazines.

A minimum clearance distance of 500m between the explosives manufacturing facility and any inhabited buildings or work areas is designed. In future studies, compliance to Mexican regulations will need to be included into the design. The location of the blasting plant and the explosives magazines are determined by the table of distances that govern the manufacturing and storage of explosives and blasting agents. The contractor will be responsible for proper placement of magazines and facilities.

Different contractors have various explosives products and specifications. The chosen contractor will be responsible for providing all Material Safety Data Sheets (MSDS) and product fact sheets as applicable.

16.9.4.5 Explosives Loading

Loading of the explosives will be done with bulk explosives loading trucks provided by the explosives supplier. The trucks should be equipped with GPS guidance or otherwise tied into the in-pit data network, and should be able to receive automatic loading instructions for each hole from the engineering office.

Explosives loading will be carried out by the contractor’s crews with their immediate supervisor; however, they must report to the owner’s Drilling and Blasting Foreman who will work alongside the Drilling and Blasting Engineer to ensure that explosives loading is carried out according to the mine’s specific needs.

The blast holes will be stemmed to avoid fly-rock and excessive air blasts. Crushed rock will be provided for stemming material and will be dumped adjacent to the blast pattern. A small front-end loader, owned and operated by the mine, will be used for blast hole stemming. Any crushed rock required for blast hole stemming will be provided by the onsite rock crusher specified for mine roads and quarrying operations.

16.9.4.6 Blasting Operations

The blasting crew will be provided by the contractor and will coordinate the drilling and blasting activities to ensure a minimum of two weeks of broken material inventory is maintained for each shovel. Also, the blast patterns will not be staked; therefore, the blasting activities will also need to be tied into the in-pit data network. The blasters will require hand-held electronic location devices to identify the holes for the pattern tie-in. A detonation system will be provided by the contractor and will consist of an initiation device, detonating cord, surface delay connectors, and boosters.

Blasting activities are day shift activities only and can only occur during the five days each week that the mine's Drilling and Blasting Foreman is present.

16.9.4.7 Loading

Bench widths are designed to ensure operating room is suitable for efficient double-sided loading of trucks at the shovels. This study does not reduce shovel productivities in areas where double-sided loading is not possible (such as the upper benches of the pit phases where the end of the bench meets topography), as it is assumed that ancillary equipment will be deployed in non-productive operating areas, to prepare the digging areas for higher shovel productivity. This can entail dozing small benches down slope to the next bench, trap dozing, and other dozing activities to attain minimum mining width for the shovels.

Any significant move of a primary loading unit will be carried out with the use of a rental low-boy truck and trailer in order to reduce wear and tear on the shovel, and to reduce down time.

16.9.4.8 Hauling

Haulage of mill feed and rock will be handled by off-highway 91 tonne haul trucks. The trucks will be outfitted with Fleet Management systems.

16.9.4.9 Pit Maintenance

Pit maintenance services include haul road maintenance, mine dewatering, transporting operating supplies, relocating equipment, and pit floor clean-up. Haul road maintenance is necessary for low haulage costs; dozer, grader, and water truck hours are allocated and adjusted to maintain the haul road network throughout the LOM production schedule.

Regular application and grading of crushed rock to haul road surfaces improves truck travel speeds, reduces mechanical fatigue to the haul trucks, and enhances tire life, which is a major mine operating cost. Crushed rock requirements for road maintenance are incorporated into the crushing and screening operation which will use available limestone rock from the pit.

Additional ancillary equipment is included in this section such as maintenance vehicles, crew and supervisor pickup trucks, cranes and other support equipment.

16.9.4.10 General Mine Expense (GME)

The GME portion of direct mining accounts for the supervision, safety, environmental, and training for the direct mining activities, typically pertaining to salaried direct mining staff. Direct mining supervision will extend down to the Shift Foreman level.

The Operations General Foreman will assume responsibility for overall supervision for the mining operation and will be responsible for open pit supervision and equipment coordination. The position reports to the Mine Manager, who in turn reports to the General Manager. A mine Shift Foreman is required on each 12 hour shift, with overall responsibility for the shift. A day shift only (five days a week), Drilling and Blasting Foreman will provide supervision for drilling and blasting during day shifts. When the Drilling and Blasting foreman is not present, no blasting activities may occur; however, drilling can be supervised by the Shift Foreman.

Initial training and equipment operation will be provided by experienced operators. As performance reaches adequate levels, the number of trainers can be decreased to a sustaining level, with a single Training Foreman providing supervision for continuous day shift only shift trainers.

Direct mining GME also includes annual allowances for general equipment rental, licensing and maintenance of mine design and fleet management software.

16.9.4.11 Technical Services

Technical Services accounts for the technical support from mine engineering, planning, geology and surveying functions. The majority of Technical Services activities fall under GME.

The Chief Mine Engineer/Mining Superintendent will direct the Technical Services department and will report to the Mine Manager, who in turn will report to the General Manager. The Senior Mining Engineer will coordinate mining engineering, drilling and blasting engineering, mine planning, and surveying. The Senior Geologist will be responsible for local step out and infill drill programs for onsite exploration activities and updating the long range geological model. The geology department will also provide grade control support to mine operations, and will manage and execute the blast hole sampling and blast hole interpolation of the short range blast hole models for operations planning.

A separate Project Engineer will assume split responsibilities for all mine geotechnical issues including pit slope stability, monitoring, and hydro-geological studies, as well as TMF engineering. The Project Engineer will also have oversight for the whole property for any geotechnical monitoring and assessment programs being carried out by safety personnel or third party consultants, or any other unspecified projects on the Property.

Technical Services GME also includes engineering consulting on an ongoing basis for specialty items such as geotechnical, operations support, environmental and geo-hydrology expertise and third-party reviews. In addition, in-fill exploration drilling is included as an allowance in the GME in the year prior to phase push-backs.

16.10 Mine Closure and Reclamation

Mexico does not have detailed closure legislation, but has national environmental laws and is currently developing more specific mine closure requirements. Guidance for the construction, operation, and closure of tailings impoundments is included in a national regulation revealed in 2003 (NOM-141-SEMARNAT-2003). Post operation criteria are presented in Section 5.7 of NOM-141-SEMARNAT-2003 and include the following:

- Upon closure of the TMF, measures must be taken to ensure that:
    - Dust is not emitted into the atmosphere as a result of the loss of moisture from the surface of the TMF or embankments, among others;
    - Runoff does not affect surface water and groundwater; and
    - The TMF embankments do not fail.
- For tailings that are potentially acid generating, the following shall be implemented:
    - Cover with a mineral material in order to prevent the formation of acid drainage from the tailings;
    - When it is not appropriate to put measures in place to prevent the formation of acid drainage, measures must be put in place for its treatment to avoid harming water bodies, soils, and sediment, either because of its acidity or by pollution with toxic elements;
    - The surface shall be covered with the recovered soil, when applicable, or with materials that allow plant species to take root; and
    - The plant species that are used to cover the dump shall be native to the region, in order to guarantee their success and permanence with a minimum of conservation.

A mine reclamation bond is not required in Mexico.

16.11 Mine Equipment

The mining equipment descriptions and specifications in this section provide general information of the size, dimension, capacity, etc. of the selected equipment. These specifications are not intended to target equipment from any specific manufacturer or vendor.

The complete mining fleet is summarized in Table 16-16 showing the initial Year-1 requirement, and the maximum LOM requirement.

Table 16-16 LOM Fleet Requirements

Mobile Fleet				
Mine Mobile Fleet	**Task / Description**	**Initial Qty**	**LOM Max Qty**	
Drilling				
Drill - Diesel Hydraulic - 150mm	Primary Drill	2	3	
Blasting				
Blasthole Loader - 80kW	Blast hole stemmer	1	2	
Loading				
Major:				
Diesel Hydraulic Shovel - 12m^3	Loading all material types	2	3	
Support:				
Dozer – 306kW	Shovel support, pit ramps and roads	1	2	
Hauling				
Major:				
Haul Truck – 91 tonne	Hauling all material types	7	18	
Support:				
Water Truck – 20,000 gallons	Road maintenance	1	2	
Dozer – 306kW	Barren rock facility maintenance	2	3	
Grader – 221kW	Road Grading, maintenance	1	2	
PIT MAINTENANCE				
Dozer – 306kW	Pit Support	1	1	
Excavator – 283kW	Utility Excavator	1	2	
Light Plant – 20kW	Lighting plant	4	4	

Forklift – 10t	Forklift	1	1	
Fuel/Lube Truck - 3,500 gallons	Mobile Fuelling	1	1	
Crew Cab Pickup	Crew Cabs, Supervisor trucks	4	6	
Dozer – 306kW	Quarry / TSF Dozer	1	1	

16.11.1Drilling

Primary production drilling at the Ixtaca Project utilizes diesel hydraulic rotary drills. These drills are outfitted with 150mm drill bits for use in all material types. Drills are outfitted with high precision drill positioning or GPS systems for efficient and accurate positioning, and superior data collection from each drill unit and drillhole.

The production drills operate in all high-wall rows, final walls, and other controlled blasting areas. Drill requirements, including the high-wall drilling, require 1 drill in preproduction and 2 drills in Year 1.

16.11.2Blasting

Blasting at the Ixtaca will be performed by contractors at a mine owned explosives storage and handling facility. The contractor will operate a proprietary MMU (Mobile Manufacturing Unit), which will deliver blasting materials to the blast pattern and mix them into explosives at the drillhole.

A small front-end loader will be used for blast hole stemming. This loader will load drill cuttings, crushed rock, or gravel into the hole to stem it and more effectively direct the energy of the blast.
One 80 kW FEL (front end loader) is sufficient for the LOM.

16.11.3Loading

16.11.3.1 Major Equipment

Production loading of waste rock and mill feed material will be performed by 12 m^3 diesel-hydraulic shovel units. These will be owned by the contractor mining company.

16.11.3.2 Support Equipment

A 306kW dozer will be stationed in the pit and is included for heavy ripping and in-pit ramp and road cuts.

These large support pieces are fitted with vehicle health monitoring systems. High precision navigation is not specified for this equipment.

16.11.4Hauling

16.11.4.1 Major Equipment

The hauler selected to match the 12m^3 shovels is the 91-t payload class diesel haul truck. The size of the haul fleet is determined by the production schedule material requirements and required truck operating hours to meet the scheduled tonnage over the haul road network for each operating period. The schedule optimizer evaluates the cycle time and destination requirements for each period and accumulates the required hours. These are combined with the appropriate availability and utilization factors to determine the required number of trucks. Haul trucks will be owned and operated by the contractor mining company for the life of the mine.

Where possible, optimization of the haulage fleet has been undertaken in this study to even out the truck fleet requirements. The LOM maximum haul fleet is 18 units.

All haul trucks are fitted with fleet management systems. These are state-of-the-art data centers that report on all facets of machine health. These include machine operating temperatures, vibration, fuel consumption, etc. The trucks may be equipped with a dispatching or positioning system.

16.11.4.2 Support Equipment

The haul support fleet maintains roads and assists maintenance of the trucks (i.e. tire manipulator).

17 RECOVERY METHODS

17.1 Introduction

Preliminary metallurgical testwork results discussed in Section 13 indicate that mill feed from the Ixtaca deposit can be processed using gravity concentration, conventional flotation, and leaching of a flotation concentrate to recover silver and gold in mill feed and produce a silver-gold doré.

A simplified process flow sheet to process an average 7,500 tonnes per day of mill feed is shown in Figure 17-1.

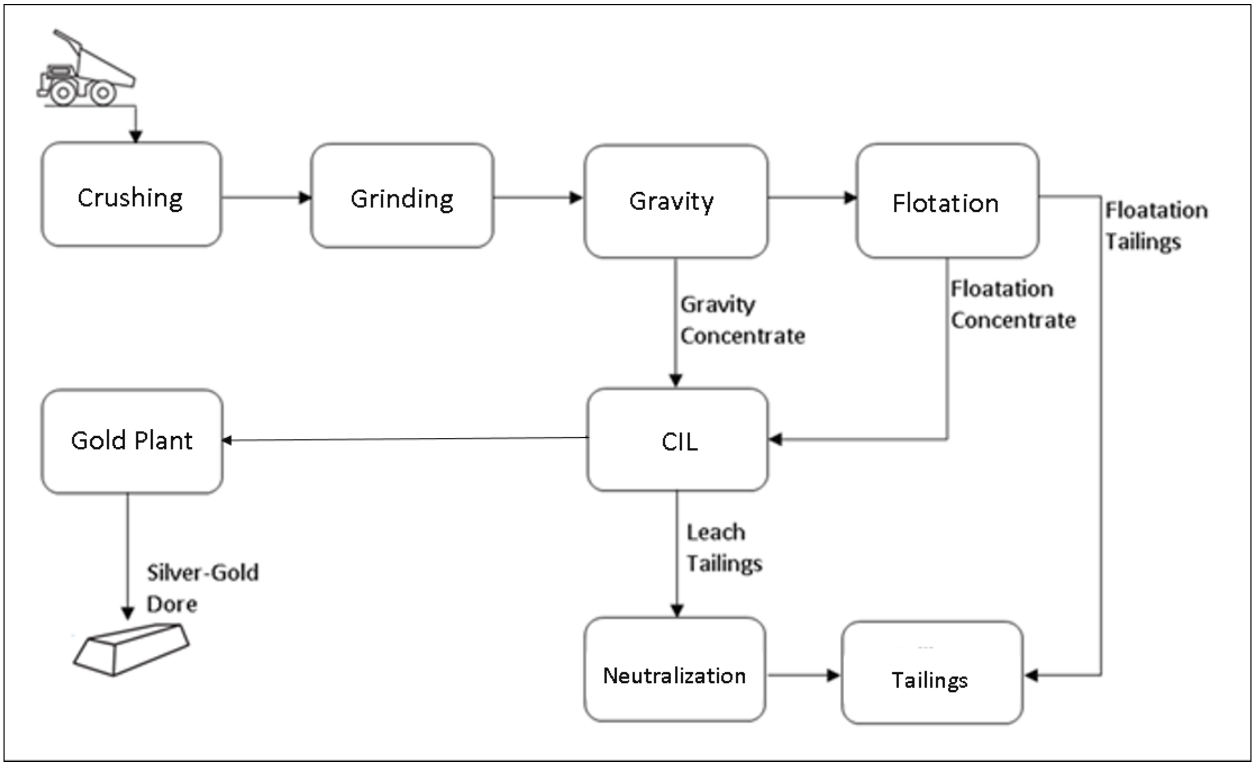


Figure 17-1 Ixtaca Simplified Flow Sheet

The processing plant includes a crushing stage, followed by grinding, gravity concentration, and flotation to produce a mineral concentrate. The gravity and flotation concentrates are leached with cyanide likely in a CIL process in agitated tanks to extract precious metals into activated carbon. In the Gold Plant gold and silver are extracted from carbon using an elution process followed by electrowining and smelting to produce a silver-gold bar with a purity of approximately 98% in precious metals.

Flotation tailings are placed in the Tailings Management Facility (TMF). Leach tailings pass through a cyanide destruction neutralization process before being placed in the TMF. Flotation and concentrate tailings will be delivered in separate pipelines to the TMF.

Process equipment planned for Ixtaca utilizes conventional technology.

17.2 Rock Creek Mill

Almaden has secured an option to acquire the Rock Creek Mill. The Rock Creek mine located in Nome, Alaska was constructed, commissioned and operated for two months before mining operation were shut down due to the 2008 global financial crisis, environmental issues, and problems with mineral reserves.

The Rock Creek mill matches Ixtaca's flowsheet, with only the flotation stage missing. Some key features of the Rock Creek mill include:

- Its flowsheet closely matches that of Ixtaca Project.
- It was built with good quality, mostly new equipment. The ball mill was bought second hand and refurbished before installation.
- At the time of the definitive shut down the mill was running in steady state condition after solving typical problems derived from the engineering and construction.
- The mill package includes all the processing facilities on site, only the building structures stay in place. Also included are the metallurgical and chemical and fire assay laboratories, and a number of spare parts for the ball mill and crushers.
- Majority of the engineering required for the Ixtaca process is complete, this will result in reduced construction time and cost savings for the Ixtaca project development.
- All the equipment is available with its associated electrical systems and controls, a number of them are installed in containers therefore relocation and reconnection will be straightforward. An aerial view of the Rock Creek process plant is shown below.

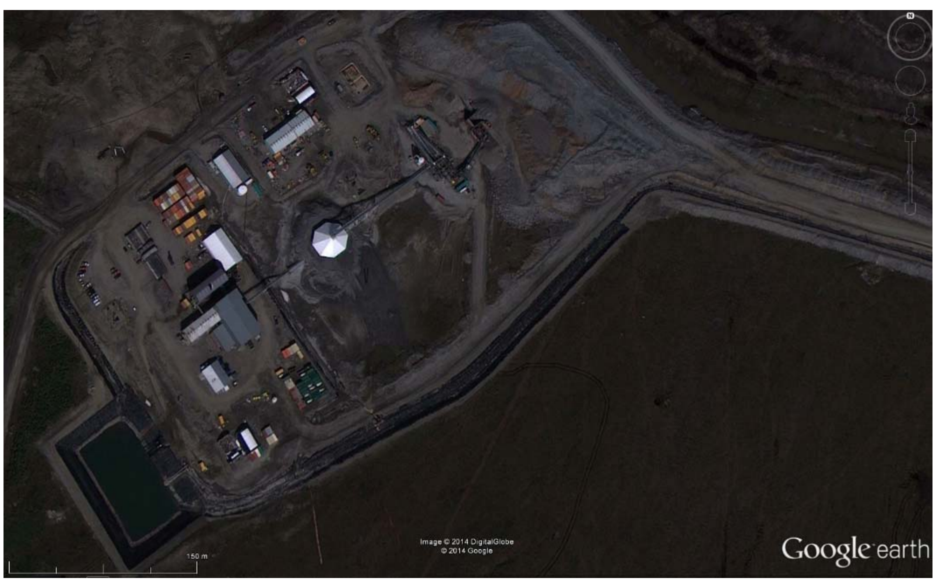


Figure 17-2 Plan View Of Rock Creek Process Plant

The Ixtaca plant foot print will be similar to the general arrangement for the Rock Creek mill shown in Figure 17-2. The Ixtaca process flow sheet will be similar to the Rock Creek flowsheet shown in Figure 17-4. Photographs from a site visit in Figure 17-5 to Figure 17-8 illustrate the good condition of the process plant.

Figure 17-3 Rock Creek Process Plant – General Arrangement

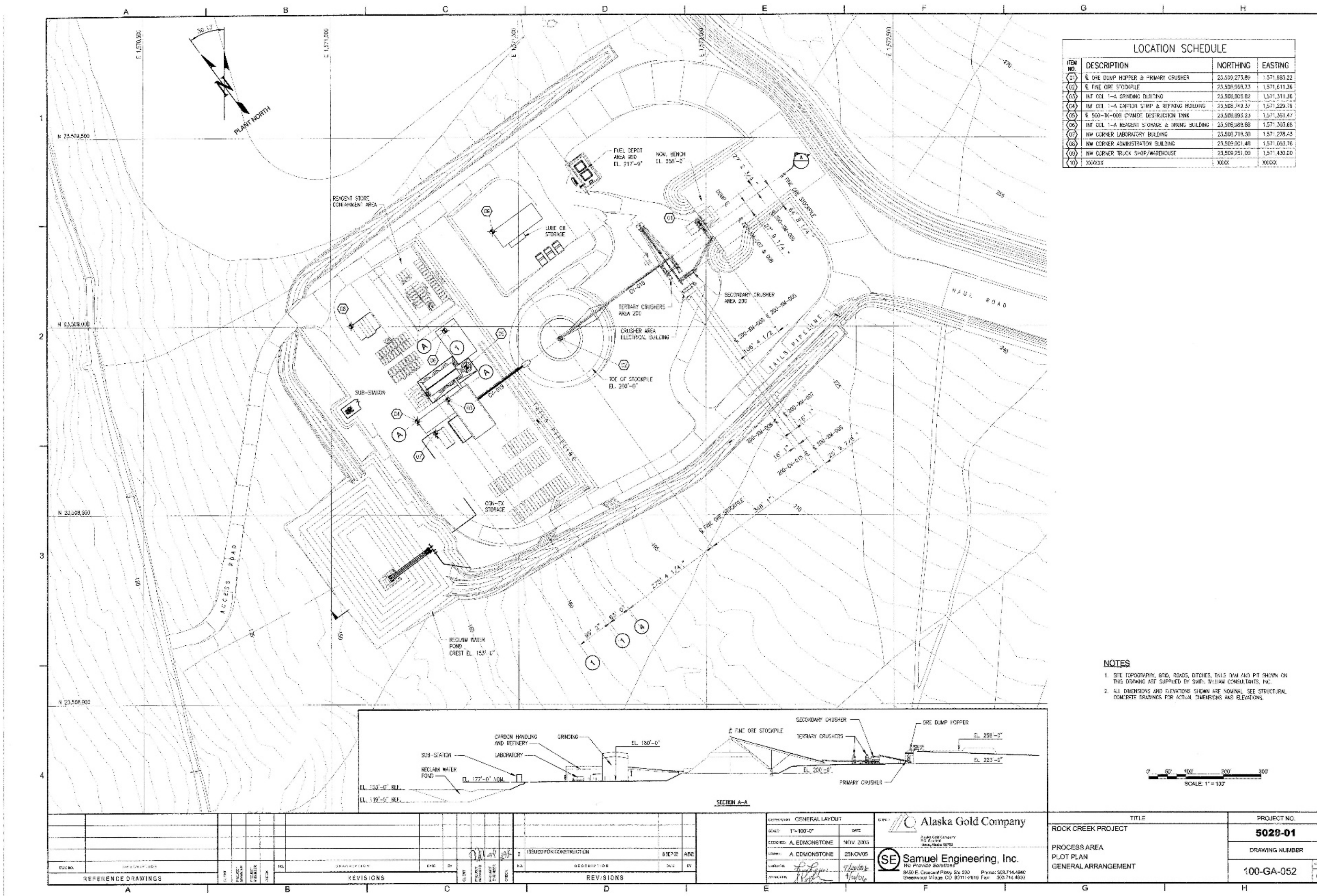


Figure 17-4 Rock Creek Process Plant – Simplified FlowSheet

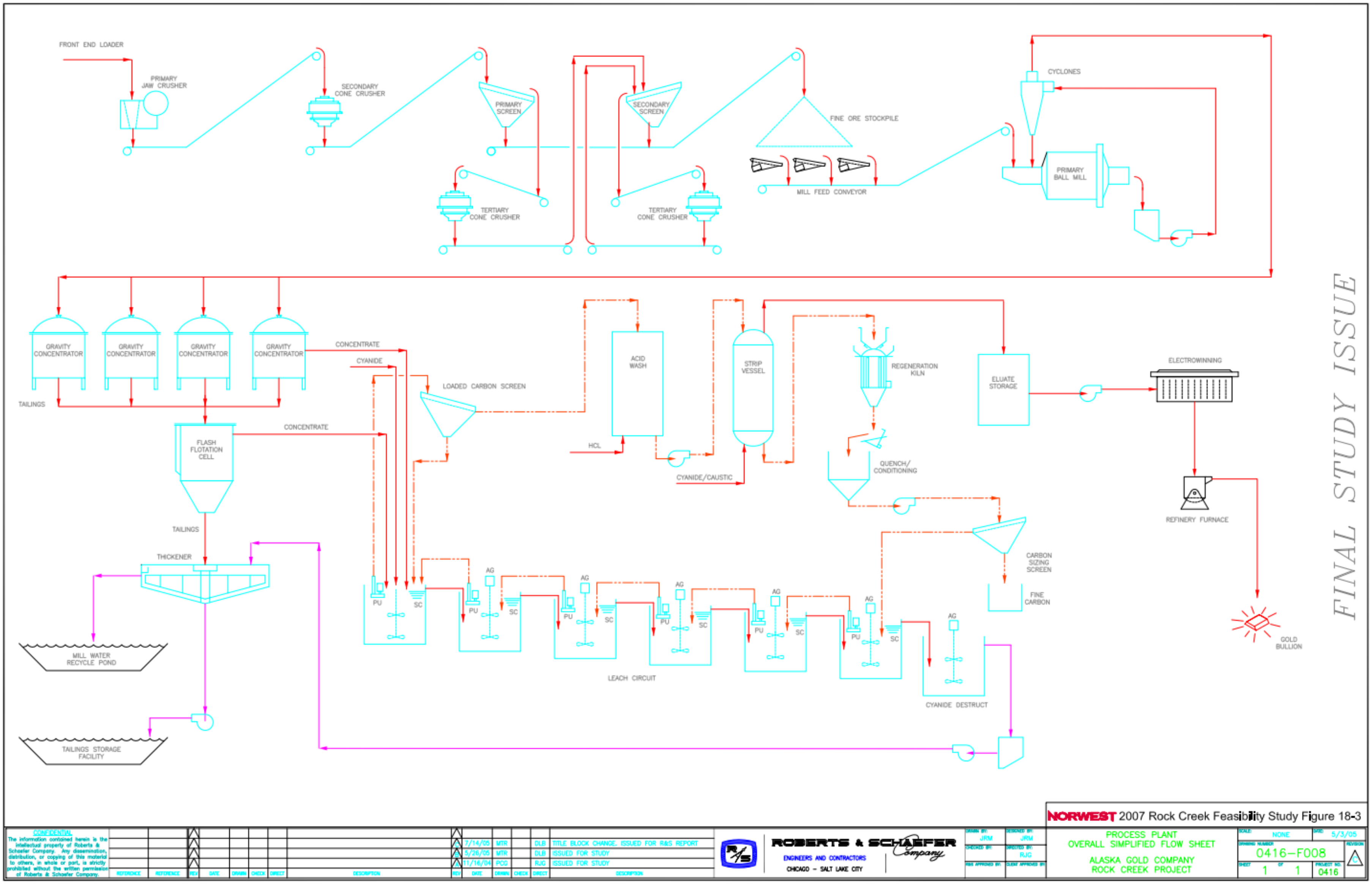


Figure 17-5 Secondary Crusher and Vibrating Screen

Figure 17-6 Recirculating conveyor in Tertiary Crushing Stage

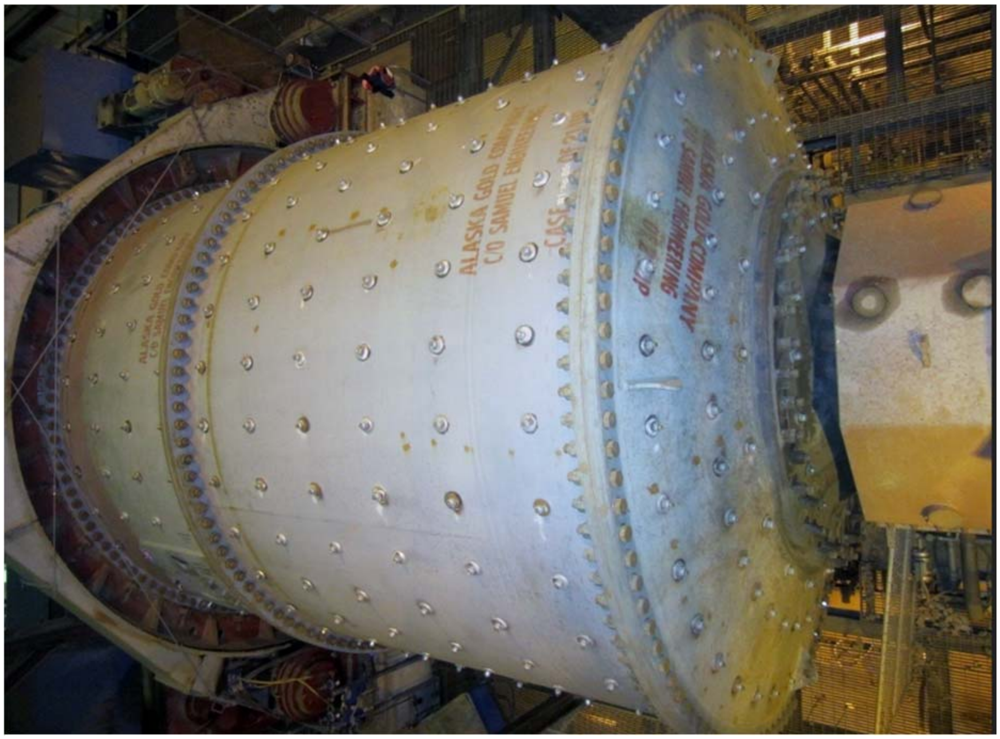


Figure 17-7 Ball Mill 18.4x25.63 ft

Figure 17-8 Four Falcon Gravity Concentrators

18 PROJECT INFRASTRUCTURE

General site facilities planned for the Ixtaca Project are:

- Site access roads
- Low-grade stockpiles
- Settlement ponds for open pit drainage water
- Explosives bulk plant and magazine
- Tailings Management Facility (TMF)
- Rock Storage Facilities (RSF)
- Power distribution
- Maintenance Facility
- Administration building
- Site wide water management facilities

Site infrastructure and ancillary buildings are presented below.

18.1 Site Access

The Ixtaca deposit, the epithermal gold-silver target within the Tuligtic Property, is located 8km northwest of the town of San Francisco Ixtacamaxtitlán, the county seat of the municipality of Ixtacamaxtitlán, Puebla State.

The Project is accessible by driving 40 km east along Highway 119 from Apizaco; an industrial center located approximately 50 km north of Puebla City, and then north approximately 20 km along a gravel road to the town of Santa Maria.

Offshoots from the main access road will connect to the primary crusher, the explosive facility, and mine pit. Ancillary roads from the site process bench connect to the truck shop and fuel storage facility. Site and access roads are depicted on Figure 16-11.

18.2 Power

Electric power is available on the Property as the national electricity grid services nearby towns such as Santa Maria and Zacatepec. Allowance had been made to extend the nearby transmission line to site at an estimated distance of 25 km.

18.3 Water Supply

Primary sources of water for processing at the Ixtaca Project include mine dewatering operations, precipitation and reclaim water after the tailings settle and consolidate in the TMF. A key parameter related to water supply/availability is precipitation. Regional and site specific data were used to determine a monthly distribution of rainfall for the project. Regional data were compiled for 7 sites in the vicinity of the Ixtaca Project and the rainfall data are presented in Table 18-1. The station that is closest and most similar in elevation to the site is the Aquixtla station, which has a mean annual rainfall of 728 mm.

Table 18-1 Regional Rainfall Data

Station	Name	El. (m)	Distance from Site (km)	Years of Climate Data	Precipitation (mm)												
					Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
21021	Capuluaque	2180	10	1978-2009	19	20	14	36	55	135	118	124	227	153	49	21	969
21008	Aquixtla	2310	8	1961-2009	11	13	16	30	50	116	99	105	147	99	31	13	728
21126	Loma Alta	2150	14	1961-2008	11	10	15	30	44	114	94	94	123	72	24	11	641
21111	Santiago Zaulta	1940	22	1954-2009	11	11	12	25	41	90	94	102	108	52	20	10	576
21207	Zaragoza	2490	33	1982-2008	21	31	15	29	74	116	126	115	268	153	57	43	1046
21103	Zacapoaxtla	1835	30	1944-2009	39	45	34	51	74	158	112	138	328	236	95	48	1358
21140	Chignahuapan	2260	18	1974-2009	11	12	16	35	53	117	102	96	133	83	21	8	687
Ixtaca - Average Loma Alta and Santiago Zaulta					**11**	**11**	**13**	**28**	**42**	**102**	**94**	**98**	**115**	**62**	**22**	**11**	**609**

A climate station was installed at the Ixtaca Project site in April, 2013.The available processed rainfall data (November 2013 to October 2014) are presented in Table 18-2. For the annual periods of May 2013 to April 2014 and November 2013 to October 2014 the rainfall totals are 803 mm and 788 mm, respectively.

Table 18-2 Ixtaca Climate Station Rainfall Data

Year	Total Monthly Rainfall (mm)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013	-	-	-	-	27	135	114	89	230	71	42	25
2014	2	4	21	30	102	108	194	112	73	92	-	-

For water balance modelling purposes and because of uncertainty about whether the site record is for a relatively wet or dry period, a conservative approach of using the average of the lowest two regional rainfall values (Loma Alta and Santiago Zaulta) was adopted so that rainfall inputs would not be over-estimated at this early stage. This resulted in a mean annual rainfall value of 609 mm for the water balance.

A generalized annual water balance was prepared for the project using the rainfall estimate and other key parameters and assumptions, as follows:

- Mean annual rainfall: 609 mm
- Mean annual evaporation: 723 mm (estimated from temperature data)
- Daily processing rate (tailings production): 7,500 tonne/day
- Tailings slurry solids content: 35%
- Ore water content: 4%
- Tailings settled dry density: 1.3 t/m^3
- Fresh water requirement: 5% of the total slurry water requirement

The generalized annual water balance considered the three catchment areas for the project, as follows:

- The largest catchment for the project site is the upper portion of the open pit catchment. A diversion system will be constructed to minimize flows into the pit, and runoff from this catchment (non-contact water) will be diverted around the open pit and into the drainage courses west of the open pit. The diverted flows will rejoin the natural flows from this catchment further downstream. Runoff from this catchment bypasses all mine facilities and is not included in the water balance.

- Precipitation and surface flows from downstream of the open pit diversion system will enter the open pit. This contact water will be pumped to the TMF and will be available for reclaim and use in processing, along with water from pit dewatering wells.
- Precipitation and surface flows within the TMF catchment will be stored in the TMF and will be available for reclaim and use in processing. Flows from the small catchment above the TMF can be diverted around the TMF as needed, according to the water balance and actual water available in the facility.

The results of the generalized annual water balance for the Stage 1 (start-up) and Stage 5 (final) TMF configurations are summarized on Table 18-3.

Table 18-3 Annual Water Balance Results

	Units	Stage 1 (starter)	Stage 5 (final)
Mill Operations Circuit			
Inputs			
Water in Ore	m^3/year	106,500	
Freshwater Requirement to Mill	m^3/year	247,300	
Outputs			
Slurry Water Requirement	m^3/year	4,944,700	
Total Reclaim Water Requirement From TMF	**m^3/year**	**4,590,900**	
Water Balance Inputs Reporting to TMF			
Water in Slurry	m^3/year	4,944,700	
Runoff from TMF Catchment, Ponds, Beaches, Dumps, Embankment	m^3/year	1,033,700	
Runoff to Pit (open pit, pit catchment area and dewatering wells)	m^3/year	1,028,000	1,028,000
Total Water Reporting to TMF	**m^3/year**	**7,006,400**	**7,131,600**
Water Balance Losses and Withdrawals From TMF			
Tailings Pond Evaporation	m^3/year	144,600	214,100
Water Lost to Tailings Voids	m^3/year	1,090,400	
Reclaim Water to Mill	m^3/year	4,590,900	
Total Water Lost Within System	m^3/year	**5,825,900**	**5,895,400**
Water Balance			
Surplus	**m^3/year**	**1,180,500**	**1,236,200**

The generalized annual water balance indicates sufficient water to meet the mill requirements without the need for additional make-up water. A water surplus in the range of 1 million m^3 is predicted for average precipitation conditions and an annual precipitation total of 609 mm. This surplus can be managed through the use of clean (non-contact) water diversion ditches around the TMF. Additional diversion ditches could also be constructed around some areas of the open pit, if needed. If a surplus develops in the TMF, then additional measures can be incorporated to control the pond volume. These measures may include enhanced evaporation (spray evaporators) or water treatment, with release of treated water to the environment. Clean water pumped from pit dewatering wells around the open pit could also be diverted downstream of the pit, into the natural drainage to reduce the surplus as needed. The water balance will be carefully monitored during operations to confirm if any additional water management measures are required.

A detailed monthly life-of-mine water balance will be prepared for future studies. The detailed monthly water balance will incorporate updated site specific hydrometeorological data address and will address extreme wet and dry conditions.

Almaden has confirmed that water concessions are available for acquisition through application to the Federal government agency, CONAGUA.

18.4 Process Area

The process area is located adjacent to the southwest rim of the pit. Process tailings are pumped in pipelines up to the TMF.

18.5 Maintenance Facility

The maintenance facility location is in the area of the crusher near the pit rim. Major maintenance on haul trucks will be done at the maintenance facility. Administration offices, dry, wash bays, warehouse, and fuel storage will also be located in this area.

18.6 Tailings Management Facility

The revised mine plan calls for storage of a total of 36 Mt of tailings delivered to the TMF at an average throughput of 7,500 tpd. This is a significant change from the previous TMF design and as a result the tailings storage arrangements were reviewed and relocated.

18.6.1 Alternative Tailings Management Facility Locations

Alternative TMF arrangements were previous identified within the TMF area. The preferred alternatives were developed on the understanding that flotation and concentrate tailings would be delivered in separate pipelines and stored within a single TMF for the following reasons:

- Recent geochemical testing on ore samples suggests that tailings will not be acid generating
- Cyanide in the concentrate tailings will be removed at the detoxification plant, and
- A single facility is technically less complicated to build and operate.

A preferred TMF location was chosen for further development based on technical and operational criteria related to embankment fill and construction, geomembrane liner, mechanical infrastructure, and expansion potential. This alternative is located downstream of the previous alignment, within the same catchment. The general arrangements for the final TMF embankments are shown on Figure 16-12.

18.6.2 Tailings Technology

Tailings are typically described by their condition at delivery. The range is referred to as the tailings continuum, which qualitatively describes the following:

- Solids content
- Thickening effort
- Method of delivery to facility, and
- Segregation during placement.

Solids content is generally accepted as the defining parameter for tailings technology and the various technologies are categorized in **Error! Reference source not found.**4.

Table 18-4 Tailings Technology

Tailings Technology	Typical Solids Content at Discharge (by mass)
Conventional Slurry	30-35%
Thickened Slurry	45-50%
Ultra-Thickened Slurry	55-65%
Paste	70-75%
Filtered (Dewatered)	85%

A high level assessment of tailings technology was conducted. Conventional slurry tailings disposal is the recommended technology for tailings disposal at the Ixtaca Project based on the availability of surface water, the complexity of other options, and consideration of capital and operating costs. The natural valley provides good containment for slurry tailings and an overall water surplus may be generated based on catchment areas and operational parameters.

Thickened and ultra-thickened tailings may be reasonable options for the Ixtaca Project. Paste and dry stack tailings are not considered to be viable options due to the high capital and operating costs, the availability of surface water on site, and potential issues with dusting in dry periods.

This introductory assessment of tailings technologies is presented for the PEA update and a more detailed assessment of Best Available Technology (BAT) for tailings management should be completed as the project advances.

18.6.3 Design Criteria Summary

Design criteria were established for each of the project facilities during the PEA update. The TMF has been designed for a 13-year mine life with an average throughput of 7,500 tpd and a total mill throughput of 36 Mt. Conventional slurry tailings discharge was assumed for both tailings streams (flotation and concentrate) with an assumed slurry solids content of 35%. The settled dry density of the combined tailings was assumed to be 1.3 t/m3. Flotation and concentrate tailings will be delivered in separate pipelines and stored within a single TMF. The TMF starter embankments were designed to store a minimum of 2 years of tailings production. The key TMF design criteria are summarized on Table 18-2.

The TMF will have a lining system on the upstream embankment face for seepage control. TMF embankments are designed with 3H:1V upstream slopes to facilitate liner installation and 2H:1V downstream slopes for stability. The embankments will be constructed and expanded using the downstream method to promote ease of liner installation during staged embankment raise construction. Waste rock storage provisions have been estimated by MMTS. Proposed waste rock storage areas are shown in Figure 16-12.

Table 18-5 Ixtaca TMF Design Criteria Summary

Life of Mine	13 years
Mill Throughput (Tailings Production)	7,500 tpd
Tailings Slurry Solids Content By Weight (Assumed)	35%
Total Tailings (includes Flotation and Concentrate tailings) Tailings Settled Dry Density Total Tailings Volume	36 Mt 1.3 t/m3 28 Mm3
Freeboard Allowance	5 m
Upstream Embankment Slope	3H:1V
Downstream Embankment Slope	2H:1V
Crest Width	20 m

18.6.4 TMF Design Concepts

The following sections provide a brief description of the TMF design concepts:

Embankment Construction

The preliminary design of the embankment includes the following zones:

- Bedding Layer – a processed bedding layer will be placed on the upstream embankment face to provide a smooth surface for installation of the geotextile and HDPE geomembrane.
- Zone C – the upstream waste rock fill zone that will be placed and compacted in lifts.
- Waste Rock – the downstream embankment fill zone to be placed in thicker lifts than the Zone C material

It has been assumed that there will be sufficient and suitable waste rock available to construct the entire TMF embankment over the mine life. This includes material from pre-stripping operations to construct the Stage 1 (Starter) embankment and material during operations to construct the remaining embankment stages.

The embankment fill zones (Zone C and Waste Rock) will require foundation preparation prior to placement of the fill materials. This will include clearing, stripping and grubbing and stockpiling of topsoil materials for later use in reclamation.

Drainage systems will be provided in the TMF embankment and foundation. An allowance for the drainage systems is included in the cost estimate and consists of a longitudinal underdrain system with a number of connecting transverse drains.

All embankments have been designed for downstream construction and 20 m crest widths at both Initial and Final Stage of construction.

Embankment and Basin Lining System

The preliminary design includes a lining system on the upstream face of the TMF embankment. For this evaluation, it has been assumed that a 100 mil HDPE geomembrane will be used. The lining system includes a non-woven geotextile underlay, which will be placed on the prepared Bedding Layer. The geomembrane will be placed over the geotextile and anchored at the embankment crest and toe.

Tailings Distribution and Reclaim System

The tailings distribution system will deliver the flotation and concentrate tailings slurry in separate pipelines for storage within a single TMF. For this study an assumed slurry content of 35% has been adopted, with a settled dry density of 1.3 t/m3. Tailings will be deposited from the perimeter of the facility over the life of the operations. A pump system will be required for tailings distribution. A provision for pipeline spill containment facilities is included in the initial capital.
Runoff and supernatant water will accumulate in the TMF. A floating pump barge and pipeline will be installed to allow for water to be reclaimed from the TMF supernatant pond for mill operations. The reclaim barge will be positioned in the location of the initial (start-up) pond and will move with supernatant pond as the tailings level raises. The reclaim water pipeline will extend from the barge to the mill.

Seepage and Runoff Management System

A seepage and runoff management system will be provided for the TMF. This system will include a lined seepage collection pond located downstream of the Final Embankment. Water from the embankment and foundation drains will also be discharged into the pond. Recycle pumps and pipelines will return the collected water to the TMF.

Diversion channels around the TMF perimeter are planned for ongoing operations. These channels will direct the inflow of non-contact water runoff past the TMF and will be constructed if a water surplus is developing.

Embankment Instrumentation

Instrumentation is included for ongoing monitoring of the performance of the TMF embankment. The instrumentation will include vibrating wire piezometers installed in the foundation and embankment fill, in addition to survey monuments. Groundwater quality monitoring wells will also be required and would be included under the mine environmental plans.

18.6.5 TMF Closure

TMF closure and rehabilitation activities will be carried out concurrently during operations (where possible) and primarily at the end of economically viable mining. Closure and rehabilitation activities will be in line with international closure standards. Measures must be taken to ensure that:

- Dust is not emitted from the facility as a result of the loss of moisture from the surface of the TMF
- Runoff does not affect surface or groundwater, and
- The TMF embankment remains stable.

- Diversion channels will be built to divert flows from the upper TMF catchment area. Supernatant water on the TMF will be removed after the mill is shut down with surplus water evaporated on the tailings beaches until capping can be completed. The following measures will be taken at closure for the TMF:
- The facility will be capped with a non-potentially acid generating (non-PAG) waste rock layer in order to transform the TMF to a convex, free-draining landform that will shed surface water runoff.
- A layer of topsoil material that was stockpiled during TMF construction will be spread over the waste rock cap to permit natural revegetation.
- A closure spillway will be constructed.

18.7 Site Wide Water Management

The open pit has a large catchment and a water diversion system is required to prevent uncontrolled runoff from flowing into the open pit and to ensure that natural runoff from un-impacted areas is maintained to the greatest degree possible. The open pit diversion system includes a diversion dam/pond and a diversion channel.

A water storage dam will be constructed in a similar manner as the TMF starter embankment using select compacted waste rock with a geomembrane (HDPE) face liner for seepage control. The diversion channel extends southwest to the existing drainage channel and the diverted water will ultimately rejoin its natural drainage course downstream.

Additional water management measures will be implemented at the open pit and will include dewatering wells and sub-horizontal drains to reduce pore water pressure in the pit walls. The pit water management systems will also include dewatering pumps and pipeworks to remove precipitation during the rainy season and after storm events.

19 MARKET STUDIES AND CONTRACTS

The Ixtaca Project is expected to produce a silver-gold bar assaying approximately 95% silver and 2% gold when assuming 98% purity; these are typical specifications for precious metals produced by the mining industry. The market for silver-gold bars is extensive with numerous buyers operating in the spot market as well as in long term contracts in North America, Europe, and Asia. Ixtaca has not yet entered into sales agreements with potential buyers.

20 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

20.1 Environmental Studies

20.1.1 Previous Environmental Studies

20.1.1.1 Meteorology

KP has been retained by Almaden to initiate a climate baseline monitoring program at the Ixtaca Project. A climate station was commissioned in early April 2013 at the Project site. The station continually monitors the following parameters:

- Wind Speed (m/s),
- Wind Direction (Degrees from True North),
- Temperature (°C),
- Relative Humidity (%),
- Atmospheric Pressure (mbar),
- Incoming Solar Radiation (W/m^2),
- Net Solar Radiation (W/m^2), and
- Rainfall (mm).

Meteorological parameters are being collected from a variety of sensors, each connected to the CR1000 data logger. A customized data logger program dictates how often the sensors are monitored and in this case generates and stores both hourly and daily statistics.

The station is located at 14Q 616,641 E, 2,176,063 N, at 2,433masl and is sited to provide representative climate data for the Project.

Additionally, climate data are available from Government of Mexico regional meteorological stations; several of which are located within 35km of the Project, each with over 25 years of daily data on precipitation, evaporation, and minimum and maximum temperatures.

20.1.1.2 Water Quantity and Quality

In June 2009, prior to Almaden conducting any drilling activities, the Autonomous University of San Luis Potosi conducted the "Baseline Hydrogeological Study of a Mining Project in San Francisco Ixtacamaxtitlan, Pue."

The main purposes of the study were to:

- Establish baseline quality parameters in surface water and springs that are used primarily for domestic use by the people; and
- Establish the flow of the main springs and streams in the study area.

The specific objectives of the study were to:

- Conduct a water well census, including wells, springs, and streams;
- Characterize water quality baseline conditions by sampling water from springs and streams;
- Determine the flow of the main surface catchments; and
- Define the hydrogeological units of the area based on the information obtained.

The results obtained in this study were:

- Surface water is of great importance for the development of productive activities within the region, mainly for agriculture and human consumption.
- Hydraulic census data indicate that the main use of surface water relies on near-surface sources, with virtually no exploitation of deep groundwater.
- The flow of springs and streams are directly dependent on the amount of precipitation.
- Most of the trace elements were below the maxima presented in the Official Mexican Standard NOM-127-SSA1-1994 for comparison of water quality. Parameters which were elevated above the standards were pH (in 5% of total samples), sulphate (10%), aluminum (38%), and manganese (15%).
- The baseline study demonstrates that the chemical quality of the water within the study area is suitable for human consumption. There are currently no on-site anthropogenic impacts on surface water and natural concentrations of potentially toxic elements commonly associated with mineralization (including arsenic, cadmium, mercury, and lead) are, at, or below the reference standard.

In 2013, hydrogeological investigations were undertaken to understand groundwater flows and volumes in the project area. Also in 2013, ongoing surface quality sampling was initiated to serve as baseline information to support a future environmental assessment of the project. Water quality parameters include total and dissolved metals, anions, and nutrients.

20.1.1.3 Geochemistry

Rock quality has been reviewed for the presence of Potential Acid Generating (PAG) waste material in a static test Acid Base Accounting (ABA) program. A total of 53 samples were selected from all potential waste rock sources.

Test methods utilized in the static program included:

- Multi-Element ICP Scan by aqua regia digestion with ICP-MS finish
- ABA by the Modified Sobek Method, and
- Leach tests with carbon dioxide equilibrated extract solution.

The testing program was conducted in accordance with Mexican regulations; including NOM-157-SEMARNAT-2009, which establishes procedures to implement mine waste management plans and Anexo Normative 5 of NOM-141-SEMARNAT-2003, which describes the test methods for whole rock chemistry analysis, leach tests and acid base accounting.

The program concluded that the geologic materials exposed, excavated and processed during mining have little potential to produce acid rock drainage or to leach contained metals. The materials contain large amounts of neutralizing potential and relatively small amounts of sulphide sulphur. Based on these testing and previous results, there is more than enough neutralizing potential present in site materials to neutralize any acid generated and no segregation of material by ARD potential is warranted. The site materials are not expected to generate leachate with concentrations of metals at above levels of concern.

20.1.1.4 Flora and Fauna

Almaden has engaged Consultores en Ecologia con Vision Integral S.A. de C.V. (COREVI) who have completed a flora and fauna study for the Project in order to develop the baseline conditions. Vegetation was studied to determine the structure and diversity of the existing communities and the geographic coverage of each characterized vegetation type. Terrestrial communities and waterfowl were also documented and assessed. The Project impacts will be developed and considered with respect to the biotic communities and, as appropriate, mitigation programs will be developed and implemented.

20.1.2 Known Environmental Considerations of the Project

Water usage is an extremely important social and environmental consideration for all existing and potential mining operations. Mexico in general is an arid country however in the Ixtaca region; preliminary water balance studies show that the mining operation would have a net water surplus for average precipitation conditions. As a result, a separate make-up water supply system is not necessary under these meteorological conditions. If a net water surplus is realized, the project would have a minimal impact on water resources and would not require subsurface supply from aquifers. Baseline data collection activities currently underway, including a hydrometric and climate monitoring program, will refine water balance modelling as the project moves forward. Future modelling will include analyses of extreme conditions (wet and dry), and a detailed evaluation of potential make-up water needs.

Vegetation and animal species protected under Mexican regulations can become disturbed during project construction. To mitigate this, flora and fauna “rescue” programs will be implemented to relocate any protected species from the Project footprint.

20.2 Permitting

20.2.1 Permitting Requirements

20.2.1.1 Mexican Legal Framework

Mine permitting in Mexico is administered by the federal government body Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT). Guidance for the federal environmental requirements is derived from the Ley General del Equilibrio Ecológico y la Protección al Ambiente (LGEEPA). Article 28 of the LGEEPA specifies that SEMARNAT must issue prior approval to parties intending to develop a mine and mineral processing plant. An Environmental Impact Assessment (Manifestación de Impacto Ambiental (MIA) by Mexican regulations) is the mechanism whereby approval conditions are specified where works or activities have the potential to cause ecological imbalance or have adverse effects on the environment. This is supported by Article 62 of the Reglamento de la Ley Minera. Article 5 of the LGEEPA authorizes SEMARNAT to provide the approvals for the works specified in Article 28.

The LGEEPA also contains articles that are relevant to conservation of soils, tailings management, water quality, flora and fauna, noise emissions, air quality, and hazardous waste management. The Ley de Aguas Nacionales provides authority to the Comisión Nacional de Agua (CONAGUA), an agency within SEMARNAT, to issue water abstraction concessions, and specifies certain requirements to be met by applicants.

Another important piece of environmental legislation is the Ley General de Desarrollo Forestal Sustentable (LGDFS). Article 117 of the LGDFS indicates that authorizations must be granted by SEMARNAT for land use changes to industrial purposes. An application for change in land use or Cambio de Uso de Suelo (CUS), must be accompanied by a Technical Supporting Study (Estudio Técnico Justificativo, or ETJ).

Guidance for implementation and adherence to many of the stipulations of environmental legislation is provided in a series of Normas Oficiales Mexicanas (NOM). These NOM provide specific procedures, limits, and guidelines, and carry the force of law. The relevant permit application will be developed as the Project progresses.

20.2.1.2 Land Use Plans

Voluntary surface land use agreements have been negotiated with landowners within the exploration prior to the start of exploration activities. Additional or revised land ownership negotiations are ongoing to accommodate alternate potential tailings storage areas, potential waste disposal areas, and potential processing plant sites. Mineral Claim owners have the right to obtain the temporary occupancy, or creation of land easements required to carry out exploration and mining operations, under the Federal Mining Law.

20.3 Social or Community Information

The Tuligtic claims are located within the State of Puebla, in the municipality of Ixtacamaxtitlán.

Ixtacamaxtitlán covers approximately 568km2 and the Tuligtic project is located in the northern portion of the municipality. Ixtacamaxtitlán is home to approximately 0.4% of the population of the State of Puebla, or 25,326 people and, although located only a short 2 hour drive from large Volkswagen and Audi manufacturing facilities, it is one of Puebla's poorest municipalities.

Mexico's Instituto Nacional de Estadística y Geografía ("INEGI") has collected extensive census data on Ixtacamaxtitlán, which provides a good general picture of this part of Mexico. The closest communities to Ixtaca are Santa Maria Zotoltepec, Zacatepec, Vista Hermosa de Lázaro Cárdenas, and Tuligtic. INEGI data indicates that these communities collectively consist of 1,136 people, of whom 42 (3.7%) are defined as indigenous.

Generally speaking, these local communities have a lack of employment opportunities with a large number of families dependent on social services. INEGI rates their degree of marginalization as "high".

20.3.1 Potential Social or Community Requirements and/or Plans

The Ixtaca project is located in an area previously logged and with little to no current land use. The mine will not require the resettlement of any communities. It is currently anticipated that water wells will not be required, as preliminary models indicate that there is sufficient water for operations from collection of rainwater. As the local community draws its water from springs at higher elevations than the mine plan, community water is unlikely to be impacted by mine development.

Almaden has invested in the Tuligtic area since 2001 and has employed up to 70 people for its ongoing exploration program. Almaden is invested in the ongoing training of employees and is actively involved in the community's health and social welfare projects. Almaden's community involvement includes local construction and improvement projects, reforestation and recycling projects, and numerous educational initiatives. Almaden has led community meetings in schools and common areas to introduce the Project and have staffed personnel in the local area to lead community engagement. Almaden has implemented a comprehensive community relations and education program for employees and all local stakeholders to explain the exploration program underway as well as the potential impacts and benefits of any possible future mining operation at Ixtaca. This program includes regular tours of the Ixtaca site which are open to all local stakeholders and include visits to the core shack and drilling operations. Almaden has also started a general mining educational program in the form of tours to existing metal mines operated by third parties elsewhere in Mexico. To date the company has conducted seventeen such tours which have enabled over 340 local residents to gain first hand understanding of operating mines.

Impacts to the socio-economy of the region may occur as the Project is developed into a mine and becomes a source of jobs. Almaden plans to continue its open communication with the communities to provide for realistic expectations of any proposed mining operations and the social impacts of such a development.

20.4 Mine Closure

Mexico does not have detailed reclamation legislation, but has national environmental laws and is currently developing more specific mine closure requirements. Guidance for the construction, operation, and closure of tailings impoundments is included in a national regulation revealed in 2003 (NOM-141-SEMARNAT-2003). Post operation criteria are presented in Section 5.7 of NOM-141-SEMARNAT-2003 and include the following:

- Upon closure of the tailings impoundment, measures must be taken to ensure that:
  - Dust is not emitted into the atmosphere as a result of the loss of moisture from the surface of the tailings dam or from the curtain wall, among others;
  - Run-off does not affect surface water and groundwater; and
  - The tailings dam does not fail.
- The following aspects shall be complied with when tailings are potentially acid generating:
  - Cover with a mineral material in order to prevent the formation of acid drainage from the tailings;
  - Plant species that promote the acidification shall not be used;
  - When it is not appropriate to put measures in place to prevent the formation of acid drainage, measures must be put in place for its treatment to avoid harming water bodies, soils, and sediment, either because of its acidity or by pollution with toxic elements;
  - The surface of the dump shall be covered with the recovered soil, when applicable, or with materials that allow plant species to take root; and
  - The plant species that are used to cover the dump shall be native to the region, in order to guarantee their success and permanence with a minimum of conservation.

No mine reclamation bond is required in Mexico.

21 CAPITAL AND OPERATING COSTS

All currencies shown in this Section 21 are expressed in USD. The expected accuracy range of this estimate is in the order of +/-35% which is suitable for a PEA-level study.

21.1 Capital Costs

Initial capital of $100.2 million is estimated for the Ixtaca Project. Initial capital costs are factored estimates derived from a combination of experience in similar projects and consultation with contractors and equipment suppliers. The Table below shows the breakdown of initial capital costs for the Ixtaca Project. These cost estimates do not include taxes or duties.

Table 21-1 Ixtaca Initial Capital Cost Summary

	$ Millions
Directs	
Infrastructure	$15.3
TMF and Water Management	$9.6
Mine Prestrip	$23.4
Mine Contractor Mob	$1.7
Process Plant	$28.0
Subtotal Direct Capital Cost	**$78.0**
Indirects And Owners Cost	$4.6
EPCM	$6.3
Contingency	$11.2
Total Initial Capital Cost	**$100.2**

21.1.1 Basis of Estimate

The cost estimate base date is December 2015 and the Scope of Work consists of direct costs, Indirect and Owner's costs, EPCM and contingency, as follows:

- Direct costs: Costs of all permanent equipment and bulk materials and the installation costs for all permanent facilities.
- Indirect and Owners costs: temporary construction facilities and services, construction equipment, freight, vendor erection supervision, commissioning and startup, first fills and spares. Owner's costs include costs associated with owner's facilities & services during construction, owner's project management, general fees and Owner's contingency.
- EPCM: Costs of Engineering Procurement and Construction Management services.

- Contingency: to cover necessary work within the defined scope of the project which cannot be identified or itemized at this stage of the project but is expected to be incurred.

The major facilities (areas) covered in this capital cost estimate are as follows:

- Infrastructure
- Mine Area
- Process Plant
- Tailings and Water Management

21.1.2 Site Infrastructure

Site infrastructure costs include access road upgrades, maintenance facility, truck wash, administration, laboratory and mine dry building, fuel storage, security building and fencing. Costs based on MMTS experience and benchmarked unit costs such as $/kilometre or $/m^3 of material. Labour and equipment rates and hours are estimated as well as material costs.

21.1.3 Tailings Management Facility and Water Management

High-level capital cost estimates were previously provided for the major waste and water management components for the Ixtaca Project. The quantities and cost estimates have been updated to reflect the revised mine plan with a reduced tonnage of 36 Mt and a single TMF for flotation and concentrate tailings.

The following key assumptions were made to estimate the costs for the waste and water management components for the Ixtaca Project:

- Costs related to the process plant and thickening or pumping the tailings slurry are not included.
- TMF embankment construction costs include spreading and compacting waste rock only. It is assumed that the other activities are included as part of the mine operating costs (drilling, blasting, loading, and hauling).
- Operating costs for the TMF and mine site infrastructure are not included.
- Costs for Closure and Reclamation have not been included.
- No water treatment costs are included.
- A contingency of 30% has been included.
- A make-up water supply system is not included.
- Costs related to the open pit dewatering systems include dewatering wells and drains (5 deep wells, 10 perimeter wells and approximately 210 horizontal drains assumed over the life of the mine).
- No discounting (NPV) or escalation (inflation) has been applied.
- The costs have been separated into two main components:
  - Tailings Management Facility, and
  - Open Pit Water Management.

Initial Capital and Sustaining Capital costs are provided for each component. Details of the costs for the TMF and the Open Pit Water Management are presented on Table 21-2

Table 21-2 Tailings and Water Management Capital Cost Summary

Description	Initial Capital Costs ($million)	Sustaining Capital ($million)	Total Capital ($million)
Tailings Management Facility	$5.8	$10.3	$16.1
Open Pit Water Management	$3.8	$5.7	$9.5
Subtotal	**$9.6**	**$15.9**	**$25.5**
Contingency (30%)	$2.9	$4.8	$7.7
TOTAL	**$12.5**	**$20.7**	**$33.2**

The capital costs for waste and water management (initial and sustaining capital) are estimated to be approximately USD $33.2 M including a contingency of 30%. This excludes costs for drill, blast, haul and placement of all waste rock materials in the TMF embankments, which are included separately in the mining costs developed by MMTS.

21.1.4 Pre-stripping

Mining operating costs are applied against the pre-stripping tonnage detailed in the production schedule. Total pre-stripping material required to be moved in Year -1 is 12 million tonnes with a capitalized mine operating cost of $23 million.

21.1.5 Mining Equipment

The Project will be operated using contractor mining therefore the capital cost of the mining equipment will be covered by the contractor company. A capital cost allowance of $1.7 million has been made for the contract miner mobilization fee.

21.1.6 Processing and Plant

The direct capital expenditure for the processing facilities is estimated to be $28 million. This includes a combination of budgetary quotes and factored estimates for the acquisition of and relocation of the Rock Creek Mill, and factored estimates for refurbishment and construction

Table 21-3 Process Capital Cost Summary

Process Direct Capital Cost	Initial Capital ($million)
Used Mill Relocation	9.6
Construction	5.0
Refurbishment	3.0
Float Plant	5.0
Regrind	0.9
Leach	1.8
Detox Plant	1.7
Conveyors	1.0
Grand Total Process Directs	**28.0**

21.1.7 Indirects, EPCM, Contingencies and Owner's Costs

A 13% contingency is applied to the TMF and Water Management item. A 20% allowance is applied to the Processing and Plant item for Contingency and Indirects. The Site Infrastructure, Power and other items has the following factors applied:

- Indirects and Owners Costs are an estimated 6% of Direct Capital Cost
- EPCM is an estimated 8% of Direct Capital Cost
- An Overall contingency of 13% is applied

21.2 Operating Cost Estimate

The total life of mine operating costs for the Ixtaca Project are $27/tonne mill feed. Conveying mill feed is estimated to save approximately $0.50/tonne compared to hauling mill feed by trucks. Operating costs are summarized in the Tables below:

Table 21-4 LOM Operating Costs

Mining Cost	2.19	$/t mined
Mining Cost	11.63	$/t mill feed
Process Cost	13.73	$/t mill feed
TMF and Water Management	0.09	$/t mill feed
G&A	1.54	$/t mill feed
Total Operating Cost	**26.99**	**$/t mill feed**

21.2.1 Contractor Mining

The estimated contractor mine operating costs are $2.19/tonne. This estimate is based MMTS modeling of mine operating costs using local consumables prices and local labour rates. The operating cost estimate includes an estimated contractor mark-up.

21.2.2 Processing

The processing operating costs are estimated from a benchmark of similar processing operating plants, including operations in Mexico, and adjusted to reflect local electrical energy cost, and labour cost.

21.2.3 Tailings Management Facility Water Management

An allowance of $250,000/yr. is estimated for the operating costs dealing with water management (TMF).

21.2.4 General & Administration (G&A)

An allowance of $4.2 million/yr. has been made for G&A costs. This estimate is based on a benchmark of operations of similar size, including operations in Mexico, to the Ixtaca Project.

22 ECONOMIC ANALYSIS

22.1 Assumptions

The economic analysis assumes the Ixtaca Project is a 100% equity financed project. All dollar amounts in this analysis are expressed in Q4 2015 US dollars, unless otherwise specified.

The Economic analysis includes the entire project life, comprising 2 years of detailed engineering and construction and 13 of years of mining and milling.

The valuation date on which the Net Present Value (NPV) and Internal Rate of Return (IRR) are measured is the commencement of construction in Year -2. Corporate sunk costs to that point in time, including costs for exploration, technical studies, and permitting, are not included in this economic analysis.

Details of the capital and operating cost estimates are described in Section 21. The production schedule used for the economic analysis is described in Section 16.

The PEA Update base case prices are derived from a combination of spot prices and current common peer usage.

Table 22-1 Inputs for Economic Analysis

Parameter	Value	Unit
Gold Price	1,150	$US/oz
Silver Price	16	$US/oz
AU Payable	99.8	%
AG Payable	99.0	%
Refining and Transport	1.10	US$/Oz
Almadex NSR Royalty	2.0	%
Extraordinary Mining Duty	0.5	%
Special Mining Duty	7.5	%
Income Tax	30.0	%

22.2 Analysis

The economic analysis is based on production schedules that include Inferred Mineral Resources, which are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves. There is no certainty that the PEA forecast will be realized or that Inferred Mineral Resources will ever be upgraded to Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

The Cash Flow is summarized in Table 22-2.

Table 22-2 Cash Flow Summary

YEAR		-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	TOTAL
Production																	
Mill Feed	ktonne	-	-	2,316	2,723	2,650	3,196	3,161	2,659	2,763	2,707	2,650	2,650	2,650	2,705	2,686	35,515
AU	g/t			0.744	0.682	0.973	0.957	0.973	1.080	0.590	0.756	0.877	0.902	0.409	0.444	0.396	0.758
AG	g/t			57.5	50.1	63.3	38.5	42.6	69.3	31.5	47.0	60.2	54.7	31.4	37.4	38.9	47.5
Dore Produced																	
AU	kOz			47	52	75	72	66	83	43	57	66	69	31	34	28	724
AG	kOz			3,852	3,945	4,852	3,558	3,900	5,329	2,515	3,682	4,617	4,196	2,404	2,929	3,027	48,806
Revenue																	
Payable Au	$ million			54	60	86	82	76	95	49	65	76	79	36	39	32	830
Payable Ag	$ million			61	62	77	56	62	84	40	58	73	66	38	46	48	773
Less Refining	$ million			4	4	5	4	4	6	3	4	5	5	3	3	3	
Less Almadex Royalty	$ million			$ 2	$ 2	$ 3	$ 3	$ 3	$ 3	$ 2	$ 2	$ 3	$ 3	$ 1	$ 2	$ 2	31
Net Payable	**$ million**			**$109**	**$116**	**$154**	**$132**	**$131**	**$170**	**$85**	**$117**	**$141**	**$138**	**$70**	**$80**	**$75**	**1,518**
Operating Costs																	
Process	$ million			$31	$38	$37	$41	$41	$37	$38	$38	$37	$37	$37	$38	$37	$ 488
TMF and Water Mangmnt.	$ million			$0.3	$0.3	$0.3	$0.3	$0.3	$0.3	$0.3	$0.3	$0.3	$0.3	$0.3	$0.3	$0.3	$ 3
G&A	$ million			$4	$4	$4	$4	$4	$4	$4	$4	$4	$4	$4	$4	$4	$ 55
Mine	$ million			$31	$35	$44	$43	$43	$52	$41	$42	$34	$11	$12	$15	$9	$ 413
TOTAL OPERATING COSTS	**$ million**			**$67**	**$77**	**$85**	**$89**	**$89**	**$94**	**$83**	**$84**	**$75**	**$53**	**$53**	**$57**	**$51**	**$ 959**
EBITA	**$ million**			**$42**	**$39**	**$68**	**$43**	**$42**	**$76**	**$2**	**$33**	**$66**	**$85**	**$17**	**$23**	**$24**	**560**
CAPITAL COSTS	**$ million**	**$33**	**$67**	**$2**	**$2**	**$2**	**$2**	**$2**	**$3**	**$0**	**$2**	**$2**	**$2**	**$2**	**$2**	**$2**	**$ 124**
PRETAX CASH FLOW	**$ million**	**-$33**	**-$67**	**$40**	**$37**	**$67**	**$41**	**$40**	**$73**	**$1**	**$31**	**$64**	**$83**	**$15**	**$21**	**$22**	**435**
TAXES	**$ million**	**$0**	**$0**	**$3**	**$3**	**$20**	**$13**	**$13**	**$25**	**$0**	**$10**	**$22**	**$29**	**$5**	**$7**	**$3**	**155**
After-tax cash flow	**$ million**	**-$33**	**-$67**	**$37**	**$34**	**$47**	**$28**	**$27**	**$48**	**$1**	**$21**	**$42**	**$54**	**$10**	**$14**	**$19**	**280**

The pre-tax cashflow is shown in the Figure below.

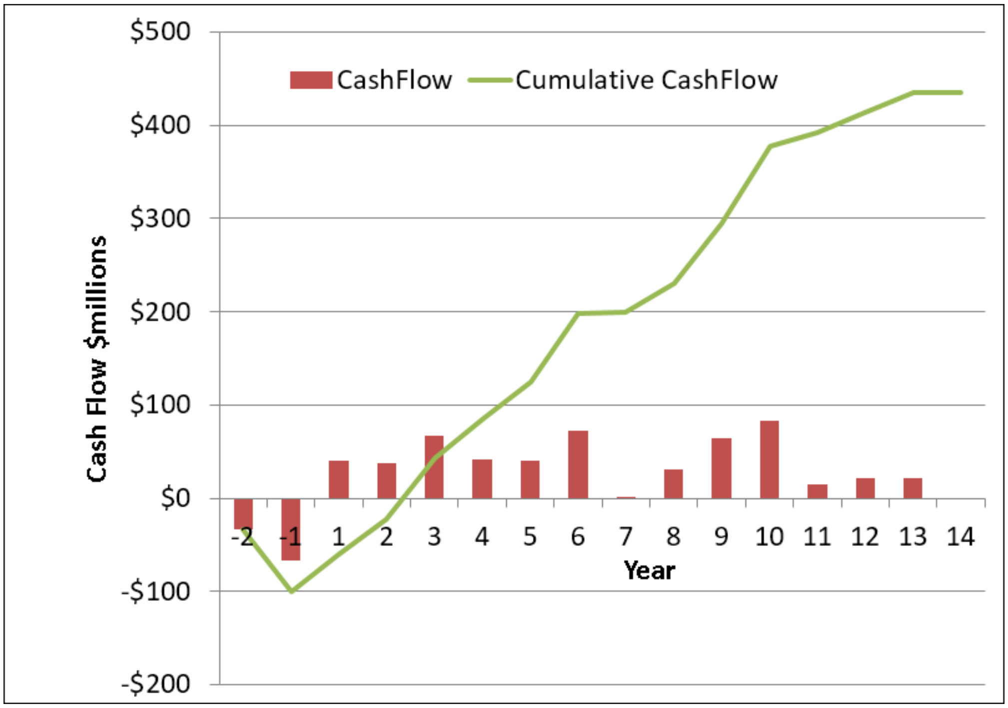


Figure 22-1 Pre-Tax Cashflows

22.3 Taxes and Mining Duties

Effective January 1, 2014, the Mexican Tax Reform increased corporate income tax rate from 28% to 30% and introduced two new mining duties. The Tax Reform includes the implementation of a 7.5% Special Mining Duty (SMD) and a 0.5% Extraordinary Mining Duty (EMD) on gross revenue from the sale of gold, silver and platinum. The SMD is applicable to earnings before income tax, depreciation, depletion, amortization and interest. The SMD and EMD are tax deductible for income tax purposes. Total taxes and mining duties for the life of the Project amount to $155 million.

22.4 Economic Results

A summary of financial outcomes comparing base case metal prices to two alternative metal price situations are presented below. The PEA base case prices are derived from a combination of spot prices and current common peer usage. The Alternate Case prices represent a discount to the lowest sustained metal prices over the previous three years. The 3 year trailing average prices represents the upside potential should metal prices regain their previous strength.

Table 22-3 Summary of Ixtaca Gold-Silver Economic Results and Sensitivities ($ Million)

	Alternate Case		Base Case		3 Year trailing Average	
	Pre-Tax	After-Tax	Pre-Tax	After-Tax	Pre-Tax	After-Tax
Gold Price ($/oz)	$1000		$1150		$1300	
Silver Price ($/oz)	$14		$16		$20	
Net Cash Flow	$235	$149	$435	$280	$731	$470
NPV (5% discount rate)	$132	$78	$266	$166	$464	$293
Internal Rate of Return (%)	24%	18%	39%	30%	57%	44%
Payback (years)	3.3	3.9	2.3	2.6	1.6	2.0

Approximately 3% of the potentially mineable tonnages in the PEA selected ultimate pit are Inferred Resources. The reader is cautioned that Inferred Resources are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that Inferred Resources will ever be upgraded to a higher category. The reader is further cautioned that the PEA is preliminary in nature, and that there is no certainty that the preliminary economic assessment will be realized.

22.5 Sensitivity Analysis

Cash flows have been estimated for the Ixtaca Project to test the Project NPV sensitivity to:

- Operating Cost
- Initial Capital Cost
- Metal Price

The Project NPV (5%) has the largest sensitivity to metal prices and is least sensitive to initial capital cost changes. The Project pre-tax NPV at 5% discount rate sensitivity shown in the Figure below:

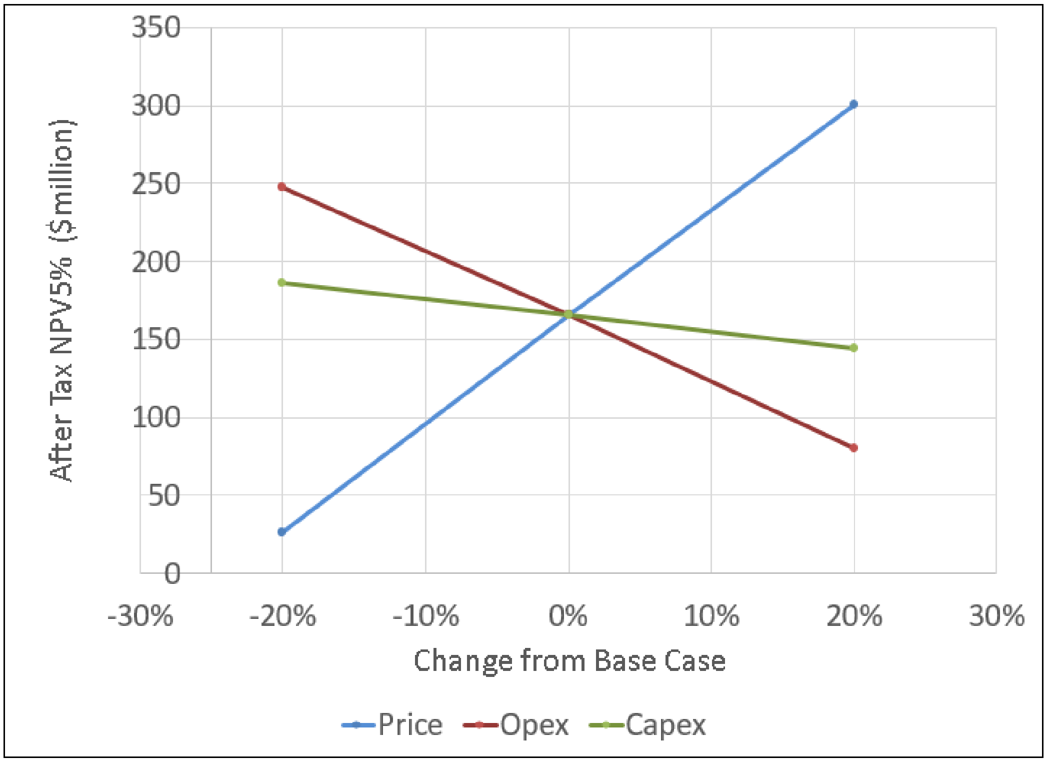


Figure 22-2 After-Tax NPV (5%) Sensitivities

The sensitivity analysis demonstrates

1. that that project NPV is more sensitive to metal price than operating cost (Opex) or capital costs (Capex).

2. The Ixtaca Project has robust economics.

23 ADJACENT PROPERTIES

23.1 Santa Fe Metals Corp. Cuyoaco Property

The Cuyoaco Property is 100% owned by Santa Fe Metals Corp. It is located approximately 4km south east of the Tuligitic Property and it covers 643 hectares over two mineralized targets: the Pau copper-silver-gold skarn, and the Santa Anita gold Project.

23.1.1 Pau Skarn Project

The Pau Project is a copper-silver-gold skarn in Santa Fe Metals' Pau claims and in the western part of its Santa Anita claims. The claims cover an area of approximately 3 square kilometers of epidote-garnet skarn mineralization around a large granodioritic pluton.

In total there are sixteen documented, historical workings on the Pau Project, many of which are believed to be as old as 16th century. The largest workings include the 170m x 200m 'El Magistral' open pit, three levels of underground workings at 'California' as well as 'Lincon' (two 50m adits), 'La Juanita' (two adits), 'La Verdiosa' and 'El Toro'.

Geology on the Pau Project is characterized by garnet-actinolite-quartz-hematite skarn style mineralization associated with two copper, silver, gold rich zones along the western and eastern margins of the granodioritic pluton. Skarn mineralization is exposed at surface in several locations and in the historical workings. Secondary (oxidized) enrichment extends for at least 10m below surface and is characterized by malachite, azurite and chalcocite but most likely does not form the bulk of the mineralization.

Soil and rock sampling in 2008 by Oremex Silver Inc. has returned high-grades of copper, silver, gold, lead and zinc from the exposed rock within workings, and mapping in 2011 has found that many of the adits ended in mineralization. Soil and rock sampling by Santa Fe Metals in 2011 has focused on further exploration of the northern part of the Pau Claim and mapping skarn mineralization between known adits. Highlights include a 7.21g/t Au, 27.7g/t Ag skarn sample in the El Magistral zone. Low grade gold (0.32g/t Au) is found within the granodiorite itself, and a previously unknown skarn showing has been discovered in the north of the Property, a further 1km north of the La Juanita adits.

23.1.2 Santa Anita Project

Santa Anita is a historic dyke-and-sill-hosted gold-rich deposit found in the east of the Cuyoaco Property. It is characterized by a zone of parallel gold-rich dykes and sills approximately 1km long and 800m wide. In 2011, a parallel dyke and sill system 200m wide and 600m in length has been discovered to the north east.

The Santa Anita gold Project covers a series of parallel, gold-rich dykes and sills that have intruded and altered a sedimentary sequence of limestone and mudstones. The dykes and sills are between 1m and 10m wide and form a 1km by 800m NW-SE trending zone. The dykes and sills are porphyritic dacites that contain varying amounts of feldspar and hornblende phenocrysts and in places up to 10% fine grained disseminated pyrite.

An extensive surface geochemical mapping program in 2008 has delineated a large gold rich envelope called the Santa Anita zone. Mineralization is found to be coarse, free metallic-gold and electrum in calcite stringers associated with narrow dacitic dikes hosted in a skarn-hornfels-limestone sequence. A limited chip sampling program of the underground workings returned an average grade of 3g/t. Fifty-eight (58) samples were collected in total.

The drilling of five shallow holes (607 metres in total) in 2005/2006 intersected gold mineralization with one hole intersecting 12 metres of 2.45g/t Au and another hole intersecting 4 metres of 2.54g/t Au.

Rock and channel samples collected by Santa Fe Metals in 2011 outline a large low grade gold anomaly that extends beyond the historical boundary of the Santa Anita gold deposit and indicates that the zone of gold-rich mineralization is considerably larger than previously thought. The parallel dyke system, named 'Santa Anita Nuevo', has a (surface) width of 200m and a strike length of 600m. To date, Santa Fe Metals has collected 29 channel samples from dykes to the north of the Property that has returned values greater than 0.1g/t.

23.2 Minera Frisco S.A. de C.V. Espejeras

The Espejeras Property is 100% owned by Minera Frisco S.A. de C.V. It is located roughly 7km north of the Tuligtic Property (Figure 4-1) and it covers a surface of 8.75 hectares. Information on the exploration work carried out in the area to date is very limited. The area is considered prospective for gold and silver and Minera Frisco's 2011 Annual Report lists the Espejeras Project among feasibility studies and implementation projects. Minera Frisco is looking to obtain environmental permits to implement an extensive diamond drilling program on the Property in the near future.

24 OTHER RELEVANT DATA AND INFORMATION

The authors are not aware of any other relevant information with respect to the Tuligtic Property that is not disclosed in the Report.

25 INTERPRETATION AND CONCLUSIONS

A PEA open pit mine plan has been developed for the Ixtaca Gold-Silver deposit using a NI 43-101 compliant Resource Estimate. The PEA mine plan shows the strong economic viability of the Ixtaca deposit and it is recommended that Almaden proceed with a pre-feasibility study (PFS).

The authors conclude that the Ixtaca deposit is well suited for proceeding to a PFS based on the following:

a) The Ixtaca deposit is well suited for open pit mining with higher grade material near surface, easy access to infrastructure and close access to the regional power grid.
b) Previous social community work done by the client has allowed for a social license to explore in the area.
c) The Project demonstrates strong economic viability at a variety of metal prices with a significant upside potential should metal prices regain previous strengths seen in the three year trailing average.
d) The resources are well defined inside the chosen ultimate economic pit limit with 97% of the mill feed classified as Measured or Indicated.
e) The Project has strong economics even with a shortened mine life with an after-tax payback of 2.6 years, depending on the metal price used.
f) The initial capital has been significantly reduced (with the option to purchase the Rock Creek Mill) and still demonstrates good economic viability.

26 RECOMMENDATIONS

The PEA of the Ixtaca deposit indicates its potential as an economically viable mining operation. The Qualified Persons recommend that the Project should proceed to a pre-feasibility study (PFS). Costs are listed in Canadian currency.

The following activities are recommended to progress the Project forward.

26.1 Tailings, Rock, and Water Management Recommendations

Additional geotechnical field data program is required for the updated tailings, waste rock storage and planned infrastructure sites.

A review of the regional hydrometeorology data to develop preliminary site specific precipitation evaporation and runoff estimates for the Project which will be used in developing water management requirements for the preferred mine development concept. A PFS level water balance is required.

Seismicity and terrain hazard assessments are required.

Production of a Tailings, Waste, and Water Management Report which will detail the results of the design work is needed.

Total engineering cost is estimated at $400,000 which includes field supervision and quality assurance, but excludes the costs for drilling and testing.

26.2 Mining Recommendations

The pit limit, pit phase designs, mining method/equipment, and production schedule will be further optimized and detailed at a design level to support a PFS. These recommendations are not necessarily contingent on positive results from previous phases but reflect the ongoing level of detail required to advance the Project.

Activities involved in updating the mining section include (but are not limited to):

- Updating the ultimate economic pit limits using Measured and Indicated Resources only from the updated block model based on the latest in-fill drilling
- Examine potential backfilling strategies to reduce waste haul costs
- Optimize the production schedule through examining various stockpiling scenarios and stockpile locations as well as RSF locations
- Update the operating cost estimates using budgetary quotes from mining contractors in the area
- Use updated operating costs and mining equipment to confirm ultimate economic pit limit
- Develop a detailed reclamation plan.

Total costs estimated between $200,000 and $300,000.

26.3 Process Recommendations

Completion of the ongoing metallurgical testwork is required to demonstrate the repeatability of achieved process recoveries.

Above metallurgical testing work and Total estimated cost is $200,000.

Process plant PFS engineering design is estimated to cost between $150,000

26.4 Environmental Recommendations

It is also recommended to continue with the long lead environmental baseline studies to support later permitting and feasibility study requirements. The initiation of these studies has been based on positive results from the PEA study.

26.5 Infrastructure Recommendations

It is recommended to proceed with onsite and offsite infrastructure details to support a PFS. Total estimated cost is $100,000.

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