MINE DEVELOPMENT ASSOCIATES
MINE ENGINEERING SERVICES

Updated Technical Report on the Preliminary Economic Assessment of the Long Canyon Project Elko County, Nevada, USA

Prepared for

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TABLE OF CONTENTS

SECTION **PAGE**

SECTION **PAGE**

LIST OF TABLES

LIST OF FIGURES

FIGURE **PAGE**

APPENDICES

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1.0 SUMMARY

Mine Development Associates ("MDA") has prepared this technical report on the Long Canyon gold project, Nevada, USA at the request of Fronteer Development Group Inc. and AuEx Ventures, Inc. ("AuEx"), joint venture partners at Long Canyon. The purpose of this report is to provide an update to the technical report entitled "Technical Report on the Long Canyon Project Elko County, Nevada, USA" (Gustin and Smith, April 2009). This updated technical report includes results of a preliminary economic assessment ("PEA") completed by MDA, as well as updates with respect to metallurgy, permitting, and drilling. This report was written in compliance with disclosure and reporting requirements set forth in the Canadian Securities Administrators' National Instrument 43-101, Companion Policy 43-101CP, and Form 43-101F1. The Long Canyon project has been previously described in a 2006 technical report (Griffith, 2006) prepared for NewWest Gold Corporation and a 2008 technical report issued by AuEx (Moran, 2008).

Fronteer Development Group Inc. holds its interest in Long Canyon through its wholly owned subsidiary Fronteer Development (USA) Inc. Fronteer Development (USA) Inc.'s interests in the Long Canyon project are derived from the acquisition of NewWest Gold Corporation by Fronteer Development Group Inc. in September 2007. Fronteer Development Group Inc., Fronteer Development (USA) Inc., and NewWest Gold Corporation are collectively referred to herein as "Fronteer".

Long Canyon, an advanced-stage exploration project, is located in Elko County in northeastern Nevada, on the east flank of the Pequop Mountains, approximately 37 kilometres southeast of the town of Wells. The project is controlled by a joint venture between Fronteer (51% interest) and AuEx (49% interest) (the "Joint Venture"). Fronteer is operator of the Joint Venture.

The main portion of the property consists of approximately 49 square kilometres of unpatented federal lode mining claims and private mineral lands; additional surface and water rights are also held by the Joint Venture . The Mineral Resources reported herein are subject to Fronteer and AuEx each retaining a 3% net smelter returns (NSR) royalty on their respective lands contributed to the Joint Venture, as well as the State of Nevada Net Proceeds of Mine Tax, which is limited to 5% of the production net proceeds (similar to a 5% net profits tax). This tax is levied by the State of Nevada on all mine production in the state.

The Effective Date of this report is August 28, 2009 unless otherwise noted.

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1.1 Geology and Mineralization

The Pequop Mountains comprise an uplifted block of regionally east-dipping Paleozoic carbonate and siliciclastic rocks. Rocks of particular interest to the project include limestone and dolomite of the Cambrian Notch Peak Formation and limestone of the overlying Ordovician Pogonip Group. At Long Canyon, the dolomite horizon at the top of the Notch Peak Formation has been dismembered into a series of northeast-elongated "megaboudins" that strongly control the distribution of gold at the project. Gold mineralization at Long Canyon occurs mainly within limestones along dolomite boudin margins and in boudin neck areas. Significant karsting, likely of both meteoric and hydrothermal origin, is localized along the boudin margins and boudin necks, resulting in large, solution-collapse cavities. Much of the higher-grade mineralization at Long Canyon is hosted within the hematitic matrix of these collapse breccias, as well as in stratiform zones characterized by strong decalcification.

The alteration, mineralization, and geochemistry of the Long Canyon deposit are similar in nature to Carlin-type sediment-hosted gold deposits. The mineralization discovered to date is almost entirely oxidized.

1.2 Exploration and Mining History

Historic mining activities at Long Canyon appear to be limited to several small prospect pits.

Gold-bearing jasperoids were discovered at Long Canyon in 1999 by Pittston Nevada Gold Company ("Pittston") as a result of follow-up work on stream-sediment anomalies defined by Pittston earlier in the year. Pittston staked claims in the area and outlined a 1400 by 300 metres gold-in-soil anomaly, which led to the drilling of seven reverse circulation ("RC") holes in 2000; one of these holes returned a significant gold intercept. AuEx acquired the project in 2005 and drilled seven additional RC holes, six of which intersected significant mineralization. The Fronteer-AuEx Joint Venture was formed later in 2006 when it was discovered that some of the AuEx claims were actually located over private mineral rights held by Fronteer and therefore were invalid. The Joint Venture has subsequently completed an additional 347 drill holes from 2006 through to the Effective Date of this report.

1.3 Drilling and Sampling

A total of 231 drill holes (33,848 metres), including 170 RC holes and 61 diamond-core holes, were completed at Long Canyon through the end of 2008; the results from these holes were used in the resource estimation discussed in this report. Down-hole drill depths range from 30 to 300 metres, with an average depth of 147 metres. The drilling was completed on a nominal 50-metre spaced grid, with the drill sections oriented northwest-southeast. An additional 130 holes, for a total of 16,030 metres, have been drilled in 2009 as of the Effective Date of this report.

Drilling at Long Canyon has been successful in defining potentially economic gold mineralization within four sub-parallel zones along a strike extent of approximately 1700 metres. The four mineralized zones at Long Canyon coalesce in various locations to form a continuous body of mineralization that plunges about ten degrees to the northeast. The mineralization has an apparent dip of five to ten degrees to the southeast in sections cut across the plunge direction, reflecting the control exerted by the upper and lower contacts of the dolomite boudin blocks. Internal to these deposit-scale geometries, boudin

noses form subvertical controls to the mineralization that dip to the northwest or southeast depending on the boudin-termination facing orientation.
Drill-hole orientations vary somewhat at Long Canyon due to both the early-stage nature of some of the holes, which were drilled before the geometry of the mineralization was understood, and the varying orientations of the controls to the mineralization. Although there are a relatively small number of holes that are therefore poorly oriented with respect to the mineralization encountered, this is mitigated by the modeling techniques employed, which constrain all intercepts to lie within explicitly interpreted domains that appropriately respect the geologic controls.

An analysis of the Quality Control/Quality Assurance data collected during the AuEx and Joint Venture drilling programs did not identify any serious issues with the sample preparation and analyses of the drill samples. The drill data do indicate the presence of down-hole contamination in some portion of the RC sample database, however. This issue was mitigated to a large extent by removing suspect intervals from the resource modeling, but some uncertainty in the remaining RC data persists.

1.4 Mineral Processing and Metallurgical Testing

Long Canyon mineralization is generally characterized as being highly oxidized and non preg-robbing, with high cyanide solubility of gold. Results from the limited test data presently available on bulk surficial materials suggest that this mineralization is amenable to extraction of gold by cyanidation via oxide milling or heap leaching methods.

All known mineralization types are not represented by the bulk samples used in the metallurgical test work. The projection of gold recoveries from surficial materials into the entire deposit, while acceptable for the purposes of the preliminary economic assessment, should be considered a risk until additional metallurgical testing is completed. Metallurgical testing of composites from large-diameter core taken from deeper portions of the deposit is ongoing and scheduled for completion in late 2009 with reporting planned for early 2010.

1.5 Mineral Resource Estimate

The gold resources at Long Canyon were modeled and estimated by evaluating the drill data statistically, utilizing three-dimensional lithologic solids provided by Fronteer to interpret mineral domains on cross sections spaced at 50-metre intervals, rectifying the mineral domain interpretations on cross sections spaced at 10-metre intervals, analyzing the modeled mineralization statistically to establish estimation parameters, and estimating gold grades by inverse-distance methods into a block model with 5 metres (width) x 10 metres (length) x 3 metres (height) blocks that were coded to the mineral domains by the 10-metre mineral domain polygons. All modeling of the diluted resources was performed using Gemcom Surpac® software.

The Long Canyon Resources are presented in Table 1.1.

Table 1.1 Long Canyon Mineral Resources

Long Canyon Indicated Resources			
Cutoff (g Au/t)	**Tonnes**	**g Au/t**	**oz Au**
0.10	6,508,000	1.79	374,000
0.20	5,565,000	2.07	369,000
0.30	***4,808,000***	***2.35***	***363,000***
0.50	3,691,000	2.94	349,000
1.00	2,496,000	4.01	322,000
1.50	1,975,000	4.75	302,000
3.00	1,272,000	6.19	253,000
5.00	743,000	7.84	187,000
10.00	107,000	12.96	45,000

Long Canyon Inferred Resources			
Cutoff (g Au/t)	**Tonnes**	**g Au/t**	**oz Au**
0.10	14,222,000	1.08	492,000
0.20	10,886,000	1.36	476,000
0.30	***8,780,000***	***1.63***	***459,000***
0.50	6,236,000	2.13	428,000
1.00	3,634,000	3.16	369,000
1.50	2,700,000	3.83	332,000
3.00	1,312,000	5.56	234,000
5.00	656,000	7.30	154,000
10.00	53,000	11.50	20,000

A cutoff of 0.30 g Au/t was used to tabulate the gold resources. This cutoff was chosen to capture mineralization potentially available to open-pit extraction and heap-leach processing. The block-diluted resources are also tabulated at additional cutoffs in order to provide grade-distribution information, as well as to cover economic conditions other than envisioned by the 0.3 g Au/t cutoff.

1.6 Preliminary Economic Assessment

MDA completed a PEA for the Long Canyon deposit in July of 2009. The PEA assumes open-pit mining using conventional trucks and shovels and run-of-mine leaching of the Indicated and Inferred resources summarized in Table 1.1 A gold price of $800 per ounce was used for the economic evaluation. Economic highlights include:

- Life-of-mine pre-tax cash flow of US$181 million
- Net present value (5% discount rate) of US$145 million
- Internal rate of return of 64%
- Payback period of 1.3 years
- Life-of-mine cash cost of $351 per ounce of gold
- Total pre-tax cost of $479 per ounce of gold
- Pit designs contain 651,000 ounces of gold
- 565,000 ounces of gold recovered

1.7 Summary and Conclusions

MDA has reviewed the project data and has visited the project site. MDA believes that the data provided to MDA by Fronteer and AuEx are generally an accurate and reasonable representation of the Long Canyon project.

The limits of the gold mineralization are not fully delineated, as the resources remain open along strike and at depth within the presently defined zones. There is also excellent potential for the discovery of new, parallel zones of mineralization related to presently unidentified occurrences of dolomite boudins.

Rock chip and soil sample results have proven to be direct guides to the definition of shallow drill targets at Long Canyon. While several attractive geochemical anomalies within permissive geologic settings remain to be tested, the gold-in-soil anomaly does not reflect the down-plunge extensions of the known resources. In these areas, more indirect methods, such as subtle flexures in the strike and dip of the overlying Pogonip Group, have successfully led to new discoveries at depth, most notably the Shadow and Crevasse zones.

The PEA shows a strong return on investment, with a payback period of less than two years.

1.8 Recommendations

Significant, relatively shallow, oxide resources have been outlined at Long Canyon that show potential to be economically viable. These resources remain open, with substantial additions conceivable. Beyond the extensions of known zones of mineralization, there is excellent potential for the discovery of new mineralized zones. It is clear that the Long Canyon project warrants significant additional expenditures.

The Fronteer-AuEx Joint Venture approved a 2009 exploration program with a budget of US$14,850,000 program for Long Canyon. The budget includes 47,000 metres of core and RC drilling, as well as a continuation of the ongoing geological mapping program, further rock, soil and road cut sampling, continued efforts pursuant to refining the Long Canyon geological model and geological controls on mineralization, and the initiation of various engineering, metallurgical, and environmental investigations.

Upon completion of the 2009 program at Long Canyon, MDA recommends that the mineral resources be updated and used as the basis for a pre-feasibility study. The pre-feasibility study would require additional data in the following areas:

- Geotechnical – Slope parameters for pit designs are needed to ensure safe and optimal pit walls. This study may require additional drilling in areas where final highwalls will be located. Results from an ongoing geotechnical investigation are expected in the fourth quarter of 2009.
- Processing – Additional metallurgical data are needed to confirm gold recoveries.
- Permitting – Parameters and time frame of a plan of operations for a mining project will need to be developed as part of the pre-feasibility study.

2.0 INTRODUCTION

Mine Development Associates ("MDA") has prepared this technical report on the Long Canyon gold project, located in the state of Nevada, at the request of Fronteer Development Group Inc. and AuEx Ventures, Inc. ("AuEx"), joint venture partners at Long Canyon. This report was written in compliance with disclosure and reporting requirements set forth in the Canadian Securities Administrators' National Instrument 43-101, Companion Policy 43-101CP, and Form 43-101F1 ("NI 43-101").

Fronteer Development Group Inc., listed on the Toronto Stock Exchange ("TSX") and the New York Stock Exchange (NYSE Amex), holds its interest in Long Canyon through its wholly owned subsidiary Fronteer Development (USA) Inc., a Delaware corporation. AuEx, a Nevada corporation, is also listed on the TSX.

The Long Canyon project has been previously described in a 2006 technical report (Griffith, 2006) prepared for NewWest Gold Corporation ("NewWest"; subsequently acquired by Fronteer Development Group Inc. in September 2007), a 2008 technical report prepared for AuEx (Moran, 2008), and a 2009 technical report compiled for Fronteer Development Group Inc. and AuEx (Gustin and Smith, 2009). This technical report updates the Gustin and Smith (2009) report.

For the purposes of this report, Fronteer Development Group Inc., Fronteer Development (USA) Inc., and NewWest will be referred to interchangeably as "Fronteer".

2.1 Project Scope and Terms of Reference

The purpose of this report is to provide an updated technical summary, including a newly completed preliminary economic assessment ("PEA"), of the Long Canyon project for Fronteer and AuEx. The Mineral Resources were estimated and classified under the supervision of Michael M. Gustin, Senior Geologist for MDA, and the PEA was completed by Thomas L. Dyer, Senior Engineer for MDA. Gary L. Simmons of GL Simmons Consulting, LLC supervised the completion of Section 16.0 (Mineral Processing and Metallurgical Testing). Mr. Gustin, Mr. Dyer, and Mr. Simmons are qualified persons under NI 43-101 and have no affiliations with Fronteer or AuEx except that of independent consultant/client relationships. The Mineral Resources and PEA reported herein for the Long Canyon project are estimated to the standards and requirements stipulated in NI 43-101.

The scope of this study included a review of pertinent technical reports and data provided to MDA by Fronteer and AuEx relative to the general setting, geology, project history, exploration activities and results, methodology, quality assurance, interpretations, drilling programs, and metallurgy. MDA has relied on the data and information provided by Fronteer and AuEx for the completion of this report, including the supporting data for the estimation of the Mineral Resources. The background information for this report, including Section 4 through Section 10, was first compiled by Moira Smith, Fronteer Development Group Inc.'s Senior Geoscientist, before review, editing, and additions by Mr. Gustin. The first draft of the Gustin and Smith (2009) report, which this report updates, used the 2008 NI 43-101 technical report on Long Canyon (Moran, 2008) as a starting point; other significant references are cited in the text and listed in Section 21.0.

Mr. Gustin visited the Long Canyon project on November 15, 2006 and July 15, 2008. These site visits included reviews of mineralized core and RC chips, examination of drill-hole cross sections showing the geologic model, investigations of representative exposures in road cuts and outcrops, and the inspection of sampling and logging procedures at active RC and core drill sites and in the project field office. Ms. Smith has worked extensively at Long Canyon and provided most of the detailed geologic descriptions, as well as the geological model, described in the report. Mr. Simmons visited the Long Canyon project site and Fronteer's Elko office on June 23 and 24, 2009 to review maps, inspect metallurgical drill core, observe drilling and core handling, and inspect site conditions in general.

MDA has made such independent investigations as deemed necessary in the professional judgment of Mr. Gustin to be able to reasonably present the conclusions discussed herein.

The Effective Date of this updated technical report is August 28, 2009, unless otherwise stated.

2.2 Definitions and frequently used acronyms and abbreviations

Measurements are generally reported in metric units in this report. Where information was originally reported in English units, conversions have been made according to the formulas shown below; discrepancies may result in slight variations from the original data in some cases.

Frequently used acronyms and abbreviations

AA	atomic absorption spectrometry
Ag	silver
Au	gold
As	arsenic
BLM	United States Department of the Interior, Bureau of Land Management
BMRR	Nevada Bureau of Mining Regulation and Reclamation
˚C	centigrade degrees
cm	centimetre = 0.3937 inch
COG	cutoff grade
g/t	grams per tonne = 34.2857 ppm = 0.0292 oz/ton
ha	hectare = 2.471 acres
Hg	mercury
ICP	inductively coupled plasma
K	thousand
kg	kilogram = 2.205 pounds
km	kilometre = 0.6214 mile
l	liter = 1.057 US quarts
lpm	liter per minute
Ma	million years old
µm	micron = one millionth of a metre
m	metre = 3.2808 feet
Ma	million years
NDEP	Nevada Department of Environmental Protection
NSR	Net Smelter Royalty
oz	troy ounce (12 oz to 1 pound)

Frequently used acronyms and abbreviations, cont.

ppm	parts per million
ppb	parts per billion
R	range
RC	reverse-circulation drilling method
SEM	Scanning electron microscope
Sb	antimony
t, tonne	metric ton = 1.1023 short tons
T	township
Tl	thallium
USGS	United States Geologic Survey

Currency Unless otherwise indicated, all references to dollars ($) in this report refer to currency of the United States.

3.0 RELIANCE ON OTHER EXPERTS

The authors are not experts in legal matters, such as the assessment of the legal validity of mining claims, private lands, mineral rights, and property agreements in the United States. The authors did not conduct any investigations of the environmental or social-economic issues associated with the Long Canyon project, and the authors are not experts with respect to these issues.

The authors rely on the information provided by Fronteer as to the title of the unpatented mining claims, private mineral rights, and water rights comprising the Long Canyon project, the terms of property and joint venture agreements, and the existence of applicable royalty obligations, as well as all information concerning environmental issues and permitting. Section 4.0 in its entirety is based on information provided by Fronteer, and the authors offer no professional opinions regarding the provided information.

MDA has relied on Fronteer to provide full information concerning the legal status of Fronteer Development Group Inc. and related companies, as well as current legal title, material terms of all agreements, and material environmental and permitting information that pertain to the Long Canyon property.

4.0 PROPERTY DESCRIPTION AND LOCATION

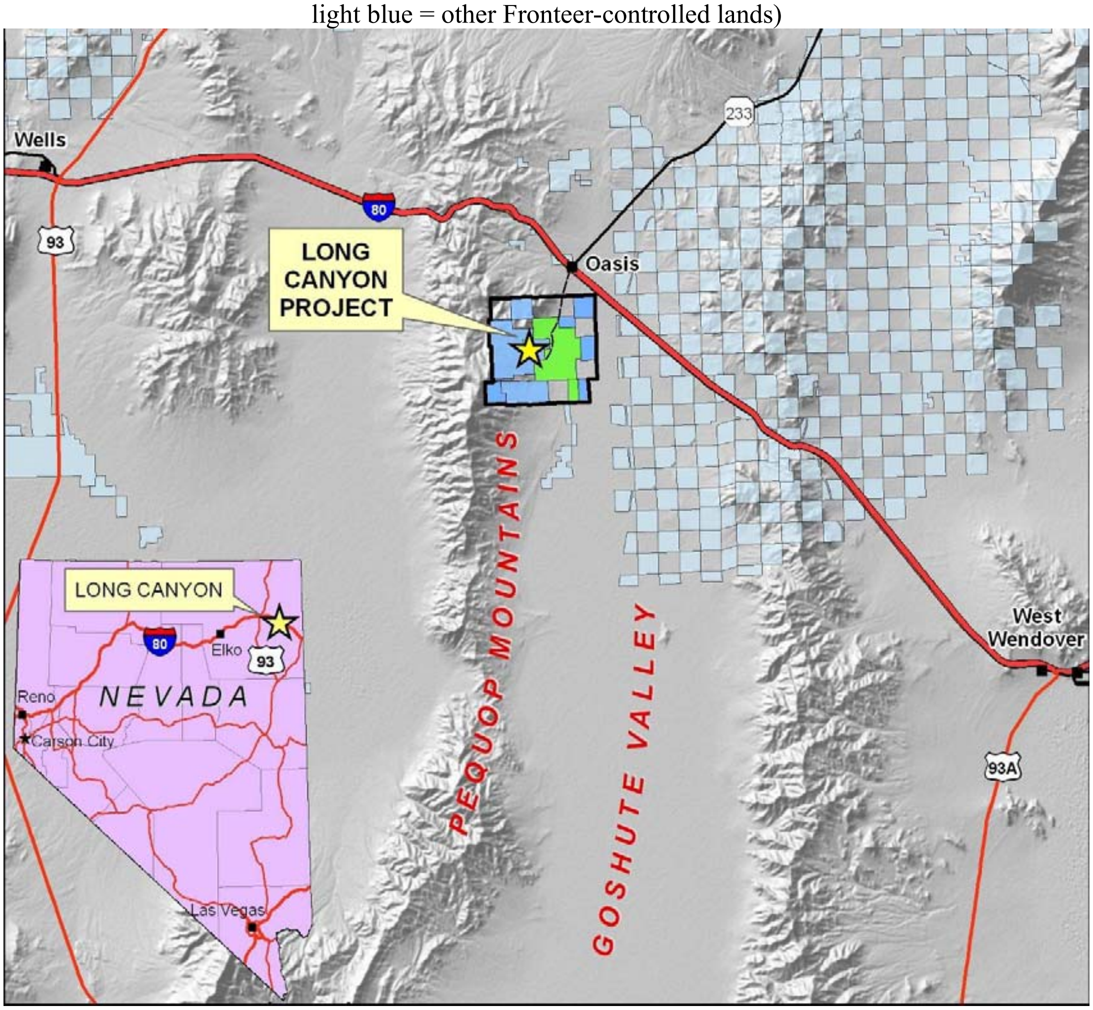
The authors are not experts in land, legal, environmental, and permitting matters. This Section 4 is based on information provided to the authors by Fronteer and AuEx. The authors present this information to fulfill reporting requirements of NI 43-101 and express no opinion regarding the legal or environmental status of Long Canyon.

4.1 Property Location

The Long Canyon project is located in the Pequop Mountains, Elko County, northeastern Nevada, approximately 37 kilometres by road southeast from the town of Wells, Nevada, and approximately 6 kilometres south of Interstate Highway 80. The main area of the Joint Venture consists of approximately 49 square kilometres of land that is located on the east side of the range (Figure 4.1); additional surface and water rights are also held by the Joint Venture (discussed below). The approximate geographic center of the Long Canyon project resources is 40° 58′ 23.70″ N latitude and 114° 31′ 52.33″ W longitude.

Figure 4.1 Long Canyon Project Location Map

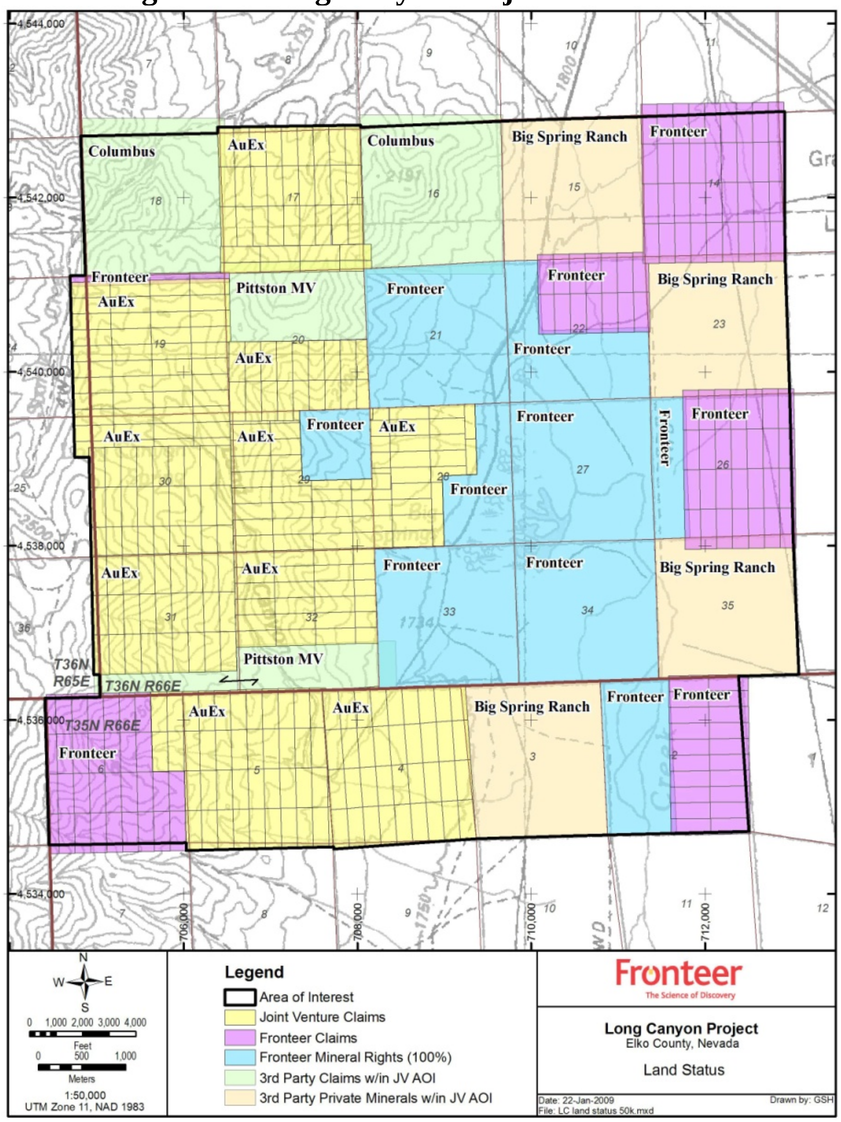
(green = Fronteer mineral rights within Area of Interest; dark blue = Joint Venture unpatented claims within Area of Interest; light blue = other Fronteer-controlled lands)



4.2 Land Area

The Long Canyon project is controlled by a joint venture between AuEx (49% interest) and Fronteer (51% interest) (the "Fronteer-AuEx Joint Venture" or the "Joint Venture"). The Joint Venture Area of Interest (Figure 4.2) includes 477 unpatented mining claims (approximately 3,322 ha) and approximately 1,578 hectares of private mineral rights held by the Joint Venture that lie in portions or all of Sections 14, 17, 19 through 22, and 26 through 34, T36N, R66E and Sections 2, 4, 5 and 6, T35N, R66E, Mount Diablo Baseline and Meridian (Figure 4.2). These claims and mineral rights held by the Joint Venture form a contiguous block of ground. The Area of Interest also includes a few blocks of third-party claims not controlled by the Joint Venture (identified as "Columbus" on Figure 4.2), as well as surface and mineral rights owned by the Big Spring Ranch. AuEx recently acquired 39 claims from Pittston Mineral Ventures located in Sections 20, 31, and 32, T36N, R66E, Mount Diablo Baseline and Meridian (Figure 4.2), all within the Area of Interest. These claims are now part of the Long Canyon Joint Venture (shown as "Pittston MV" on Figure 4.2).

Figure 4.2 Long Canyon Project Land Status



Unpatented Claims. The numbers of claims reported in this section are current as of August 28, 2009 and are listed in Appendix A.

A total of 304 unpatented lode-mining claims are held by Pittston Nevada Gold Company ("Pittston"), which explored Long Canyon prior to Fronteer and AuEx. Pittston is now a wholly owned subsidiary of AuEx subject to completion of a Members' Interest Purchase Agreement dated August 18, 2004. A total of 134 unpatented mining claims are held by Fronteer. In total, the Joint Venture controls a total of 477 claims inside the Joint Venture Area of Interest.

The unpatented claims within the project were located in the field with wooden posts that meet Nevada regulations. Validity and location of the unpatented mining claims has not been independently verified in the field. Fronteer represents that the list of unpatented claims in Appendix A is complete and accurate as of August 28, 2009 and that all claims are valid through August 31, 2009.

Ownership of unpatented mining claims is in the name of the holder (locator), subject to the paramount title of the United States of America, under the administration of the U.S. Bureau of Land Management ("BLM"). Under the Mining Law of 1872, which governs the location of unpatented mining claims on Federal lands, the locator has the right to explore, develop, and mine minerals on unpatented mining claims without payments of production royalties to the U.S. government, subject to the surface management regulation of the BLM. It should also be noted that in recent years there have been efforts in the U.S. Congress to change the 1872 Mining Law to include, among other items, a provision of production royalties to the U.S. government. Currently, annual claim maintenance fees are the only federal payments related to unpatented mining claims. Nevada BLM records of mining claims can be searched on-line at www.nv.blm.gov/lr2000/.

The holding costs of the unpatented mining claims in 2009 are estimated at about $75,000 (Table 4.1).

Table 4.1 Unpatented Mining Claims: 2009 Filing and Holding Costs

BLM Maintenance Fee Payment	$66,780.00
Elko County Annual Filing	5,012.50
New Claim Filing BLM[1]	12,580.00
New Claim Filing Elko County[1]	2,779.00
Total Filing and Holding Cost	*$87,151.50*

1. Filing fees to correct claim conflicts.

Private Mineral and Surface Rights. Fronteer owns the right to metalliferous minerals in the private mineral estate beneath portions of the Big Spring Ranch surface lands, including Sections 21, 28, and 33, T36N R66E, where the project access roads are located. Fronteer enjoys a broad right to use the surface of the land for exploration and mineral development purposes as successor in interest to the mineral estate reserved pursuant to the mineral reservation in the officially recorded Grant, Bargain, and Sale Deed to Joint Tenants dated October 18, 1946. This mineral reservation reserves to the owner of the mineral estate, (*i.e.*, Fronteer) "...all right, title and interest, to coal, oil, gas and other minerals of every kind and within said lands, including the right to the use of so much of the surface thereof as may be required in prospecting for, in locating, developing, producing and transporting said coal, oil, gas or minerals and any of their by products thereof."

Fronteer acquired these private mineral rights through a series of transactions. Western States Minerals Corporation acquired from its affiliate, Stampede Investments Inc., the private mineral interests of the Bernard H. Grube estate underlying a large part of northeastern Nevada, which Stampede acquired on May 3, 1994. NewWest acquired the metalliferous mineral rights of Western States Minerals Corporation in August 2006 and contributed these mineral rights to the Joint Venture when it was formed in 2006. Fronteer acquired NewWest in 2007.

Private Surface Rights. Except for the NE ¼ of Section 29 and the W ½ of Section 21, T36N, R66E, Big Spring Ranch owns the surface rights overlying Fronteer's private minerals estate subject to Fronteer's use under the minerals reservation. The surface estate in the NE ¼ of Section 29 and the W ½ of Section 21, T36N, R66E is public land managed by BLM. This land, which was formerly part of the Big Spring Ranch, is now BLM-administered public land by virtue of a land exchange with the Big Spring Ranch that closed on May 20, 1999 and was recorded on May 26, 1999.

On July 15, 2009 Fronteer acquired approximately 47.8 square kilometres of surface rights known as the M&N Ranch, located five to ten kilometres east of the Area of Interest. This acquisition includes 1,657 acre feet of water rights zoned quasi-municipal. This acquisition, including the water rights, have been assigned to the Fronteer-AuEx Venture. Fronteer owns the mineral rights under all of these acquired surface rights; these mineral rights are not included in the Fronteer-AuEx Joint Venture.

4.3 Agreements and Encumbrances

Gold production from Long Canyon is subject to the State of Nevada Net Proceeds of Mine Tax, which is limited to 5% of the production net proceeds (similar to a 5% net profits tax). This tax is levied by the State of Nevada on all mine production in the state.

Members' Interest Purchase Agreement. AuEx entered into a Members' Interest Purchase Agreement dated August 18, 2004, as amended (the "MIPA"), between MPI Gold (USA) Ltd. and PMV Gold Company, the owners of the outstanding membership interests in Pittston, and AuEx. AuEx completed the terms of the Members' Interest Purchase Agreement and acquired all of the outstanding ownership interests in Pittston. As of March 31, 2005, AuEx is the sole member.

AuEx is subject to the following obligations as per the Members' Interest Purchase Agreement:

- A contingent payment of 250,000 common shares of AuEx capital stock if AuEx defines at least 500,000 troy ounces of gold as measured and indicated resources by SME-1999 definitions on lands subject to the MIPA, which includes the AuEx unpatented claims within the Joint Venture Area of Interest. The resources are to be calculated based on holes drilled as of the fifth anniversary of the August 18, 2004 effective date of the MIPA.
- A contingent payment of an additional 250,000 common shares of AuEx capital stock if AuEx defines an additional 500,000 troy ounces of gold as measured and indicated resources by SME-1999 definitions on lands subject to the MIPA, which includes the AuEx unpatented claims

within the Joint Venture Area of Interest. The resources are to be calculated based on holes drilled as of the fifth anniversary of the August 18, 2004 effective date of the MIPA.

- AuEx assumes the liability for the reclamation of existing surface disturbance, drill roads, and drill sites as of the August 18, 2004 effective date, as well as the cost of annual land holding fees. This liability was subsequently assumed by the Joint Venture.

The obligations listed above apply to unpatented mining claims originally held by Pittston both within and outside the limits of the Long Canyon Joint Venture Area of Interest. The obligation of AuEx to grant any shares under the terms of the MIPA had yet to be determined as of the Effective Date of this report.

Fronteer-AuEx Joint Venture Agreement. The Joint Venture agreement, which became effective May 23, 2006, has the following key provisions:

- each Party retains a 3% net smelter returns (NSR) royalty on their respective lands contributed to the Joint Venture;
- to maintain a 51% interest in the Long Canyon Property, Fronteer was required to expend the first $5,000,000 on the joint properties, which was completed in September 2008; and
- the interests in the Joint Venture will remain at 51% Fronteer - 49% AuEx unless the interest of either party is diluted for failure to participate in funding an approved program.

4.4 Location of Mineralization

The gold mineralization identified and drilled thus far on the Long Canyon project is located on both the land holdings of Fronteer and AuEx, as shown in Figure 4.3.

4.5 Environmental Permits and Licenses

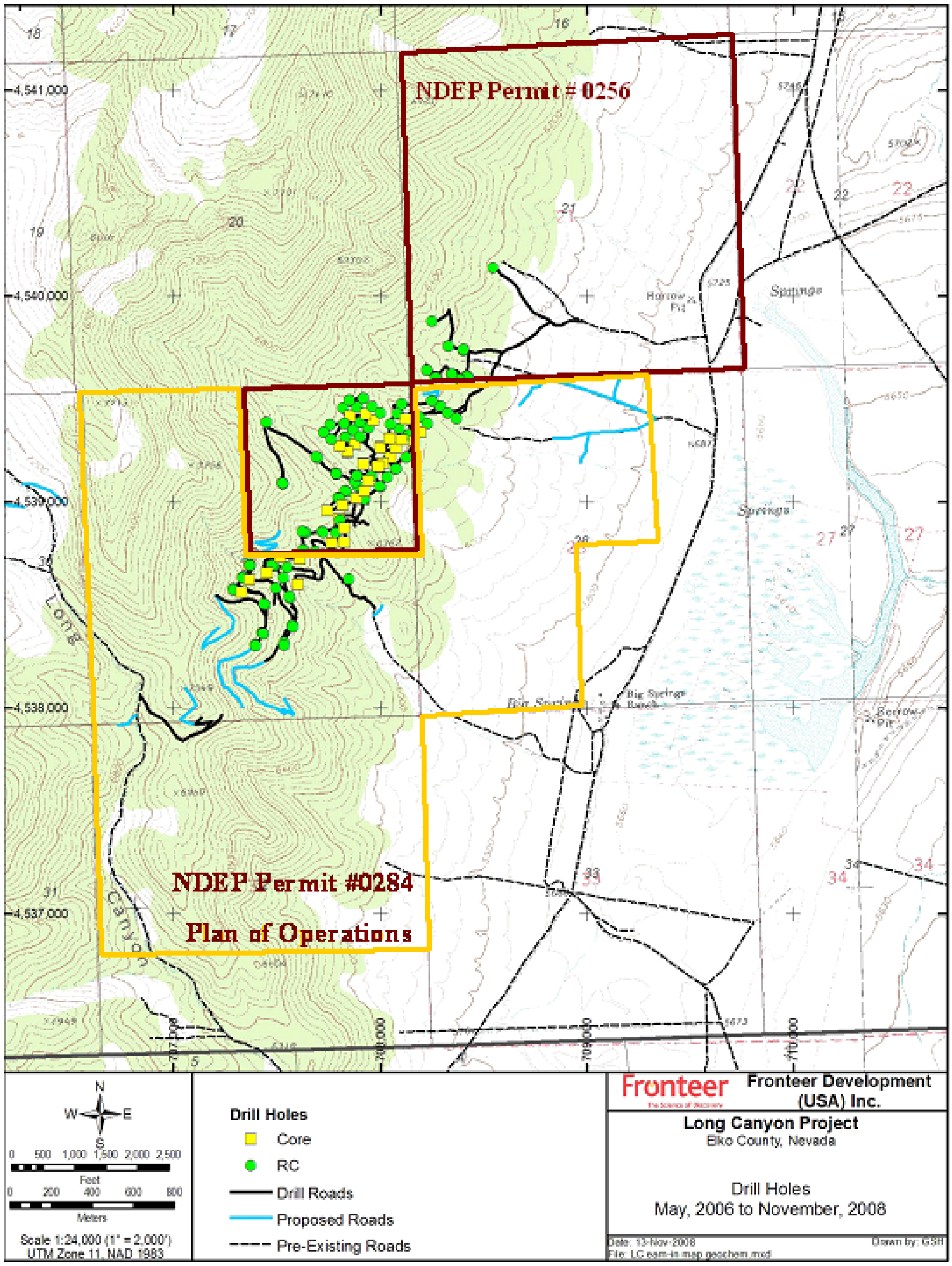
Fronteer has acquired all of the state and federal regulatory approvals and permits required for the 2009 exploration program. Three permits currently govern exploration activity at Long Canyon: NDEP/BMRR Reclamation Permit No. 0256, NDEP/BMRR Reclamation Permit No. 0284, and BLM Plan of Operations NVN-82445 (Table 4.2).

Table 4.2 Permits Covering Operations at Long Canyon

Permit	Land Status	Land Areas	Approval Date	Bond Amount	Authorized Disturbance	Current Disturbance	Comment
NDEP/BMRR Reclamation Permit No. 0256 (amended)	Public and Private Surface & Private Mineral Lands	NE1/4 Section 29, Section 21, T36N, R66E	19-Mar-09	$233,000	54.93 acres (22.22 ha)	35.16 acres (14.23 ha)	Original Permit No. 0256 granted in 2006; amended to authorize additional disturbance in 2009
NDEP/BMRR Reclamation Permit No. 0284/BLM Plan of Operations NVN-82445	Public Surface - Mining claims over Public Minerals	Sections 28, 29, and 32, SE1/4, SE1/4 Section 20, T36N, R66E,	Permit 0284: 8/28/08 Plan of Ops: 9/15/2008	$169,644; secured with $300,000 statewide bond	44.53 acres (18.02 ha)	24.34 acres (9.85 ha)	44.88 acres (18.00 ha) of disturbance currently bonded

Figure 4.3 AuEx Claims and Fronteer Private Mineral Rights Within Area Drilled

(not all project claims and mineral rights shown; AuEx claims outlined in yellow, Fronteer mineral rights in brown)



Disturbance on Unpatented Mining Claims on Public Lands. BLM Plan of Operations NVN-82445 and the corresponding BMRR/NDEP Reclamation Permit No. 0284 (the "Plan of Operations") authorizes 44.93 acres (18.18 ha) of surface disturbance in Sections 28, 29, and 32, T36N, R66E, which together form the eastern and central portion of the unpatented mining claims on Federal lands. This disturbance is associated with exploration work that will be conducted in two or more phases over a period of five years. Phase 1 authorizes 19.60 acres (7.93 ha) of new surface disturbance, which required a bond of $131,964. Fronteer provided the BLM with a $300,000 Statewide bond to satisfy the $131,964 reclamation bond requirement. Fronteer anticipates starting Phase 2 activities during 2009. Prior to commencing Phase 2, Fronteer will have to provide the BLM with additional financial assurance to secure the increased bonding obligation. The $300,000 Statewide bond that Fronteer has with the BLM will be used to satisfy the increased bonding requirement associated with the Phase 2 work. A total of 10.67 acres (4.32 ha) had been disturbed under this permit as of January 2009.

Fronteer, on behalf of the Fronteer-AuEx Joint Venture, has applied for a new permit to govern the drilling of nine hydrological holes within the Area of Interest. These holes, along with the existing four monitoring wells, are designed to test and characterize the aquifer as to water depth, quality, and gradients. Additionally, these holes will give other information with respect to the structural and rock-permeability controls of the aquifer. These holes will also assist in the geotechnical engineering, site characterization, facilities layout, and future permitting activities for the project.

Disturbance on Private Mineral Lands. The Nevada Division of Environmental Protection/Bureau of Mining Regulation and Reclamation ("NDEP/BMRR") approved an amendment to Reclamation Permit No. 0256 on March 19, 2009, which increases the authorized surface disturbance for exploration activities on private mineral lands to 54.93 acres (22.22 ha). Reclamation Permit No. 0256 governs the exploration activities on the private mineral lands in the NE ¼ of Section 29 and all of Section 21, T36N, R66E, which together form the northwestern part of the area of private mineral rights owned by Fronteer (Figure 4.2). Fronteer provided a reclamation bond in the amount of $223,200 to NDEP/BMRR on April 16, 2009. With this permit in hand, Fronteer can conduct close-spaced drilling to support additional resource definition and to extend the road network and drilling effort to the northeast to allow for testing of extensions of the presently identified mineralized zones. As of January 2009, a total of 19.7 acres (8.0 ha) had been disturbed on private mineral lands subject to NDEP/BMRR Permit No. 0256.

Hydrologic Investigations. At present, Fronteer is in the process of satisfying a permit condition in the Plan of Operations to drill a supplemental water production well for the cities of Wendover, Utah and West Wendover, Nevada to address the cities' concerns about potential impacts from exploration drilling to the nearby Johnson Springs, one of the cities' water sources. Fronteer has worked closely with the cities to identify three targets in the Northern Goshute Valley, roughly 16 kilometres southeast of Long Canyon, for the supplemental well. A hydrologic test hole 305 metres in depth was drilled on one of the sites in late March 2009. A hydrogeologic investigation was completed in June 2009 to evaluate the suitability of this site for the supplemental well. The site was chosen in the NE/4 of Section 11, T35N, R67E, Elko County, Nevada. This well (know as Shafter # 6) has been completed and tested at 530 gallons per minute (33.5 liters per second) continual pumping for 48 hours. The water quality met all drinking water standards. The well house, pumping and piping facilities, and power are currently being constructed for this production well. All facilities should be constructed, tested, and ready for use by December 31, 2009.

Following completion and testing of the Shafter # 6 Well, the cities of West Wendover, Nevada and Wendover, Utah approved a request by Fronteer to allow Fronteer to drill below the level of the of the Johnson Springs water table (an elevation of 1,731 metres). A restriction was in place in the BLM Plan of Operations that would not allow Fronteer to drill below this elevation until Fronteer had completed a production well capable of replacing the 448 gallons per minute permitted water usage of the two cities from Johnson Springs. The cities sent letters to the BLM indicating that Fronteer had met its commitment to construct a replacement well for the cities and further requested the BLM to allow Fronteer to initiate drilling at Long Canyon below this elevation. Following discussions with Fronteer, The BLM-approved drilling below the level of Johnson Springs and Fronteer initiated drilling for targets below this elevation on September 23, 2009. This drilling will allow the Joint Venture to test mineral targets deeper than has been possible to date and should provide additional information on mineralization and the groundwater characteristics of the deposit. In addition, permitting is underway for drilling and installation of an additional nine monitoring wells in and around the deposit.

In addition to working together on the supplemental well, Fronteer and the cities have entered into a conceptual Memorandum of Understanding (“MOU”) to work together to establish a mutually beneficial public sector-private sector working relationship to characterize and develop groundwater resources to support future municipal growth and mineral development. Recognizing the importance of these key stakeholders, Fronteer is looking forward to finalizing the MOU and initiating the hydrologic activities described in the MOU.

4.6 Environmental Considerations

Environmental liabilities at the Long Canyon project are limited to the reclamation of disturbed areas resulting from exploration work conducted by Pittston, AuEx, and Fronteer since 2000. Evidence of previous mineral exploration activity consists of several small, widely spaced shallow prospect pits of unknown origin and age. Class III cultural resource surveys, conducted in 2000, 2006, 2007, and 2008, recorded a number of minor prehistoric and historic artifact sites within the project area. In accordance with applicable permits, exploration activities will avoid or mitigate cultural resources.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Access to Property

Access to the Long Canyon project is via Interstate Highway 80 to exit 378 (the Oasis exit), 42 kilometres east of Wells, Nevada, then proceeding 6.4 kilometres south on Elko County Road 790, which is an all-weather gravel road to the Big Spring Ranch. Access within the project area is through use of other roads and/or easements open to the public, and, as necessary, crossing some private land subject to Fronteer's dominate mineral reservation or that Fronteer has otherwise established the right to use.

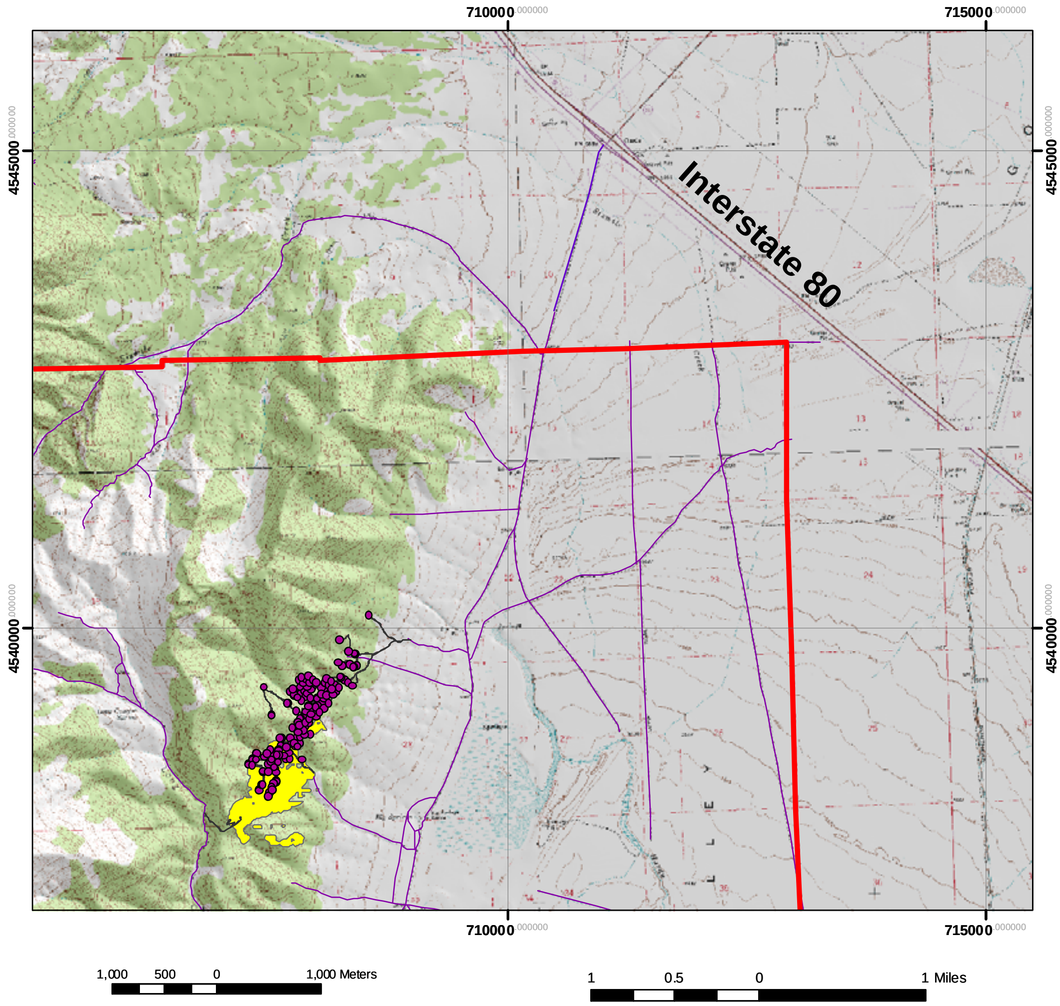
In April 2009, Fronteer entered into a five-year road maintenance agreement with Elko County. Under the terms of this agreement, Elko County and Fronteer now share the responsibility to maintain County Road 790. Although this road proceeds through the Big Spring Ranch and provides public access to points south of the Ranch, at the request of the lessee of the Ranch, exploration traffic uses a dirt by-pass road that AuEx constructed and improved in 2005. This bypass road is located on lands in Sections 28 and 33 where Fronteer owns the private mineral estate. The bypass road circumnavigates the Ranch headquarters on the uphill side. From the by-pass road, several short, unimproved dirt roads access the drill grid area. The drill grid area is located approximately 1.6 kilometres west of the Big Spring Ranch (Figure 5.1).

5.2 Climate

Climate is typical for the high-desert regions of northeastern Nevada with hot, dry summers and cold, snowy winters. Summer high temperatures range from 30˚ to 38˚C, with winter low temperatures typically -20˚ to -10˚C and winter high temperatures of 0˚ to 5˚C. Most of the precipitation in the region falls as snow in the winter months, with lesser precipitation as rain in the spring and thunderstorms during the late summer. Winter storms can deposit several metres of snow, with elevations above 2100 metres being continually snow covered from November through April.

In the absence of all-weather road access to drill sites, a typical exploration-operating season for the Long Canyon project is from mid-May through early November. Improved road access and road maintenance/snow removal equipment could extend the exploration operating season through the winter months if necessary.

Figure 5.1 Long Canyon Project Access



5.3 Physiography

The Long Canyon project lies in the Basin and Range physiographic province of Nevada and western Utah. The project site is located on the eastern side of the Pequop Mountains in northeastern Nevada (Figure 5.2), which has elevations ranging from 1675 to over 2750 metres on the ridge tops. Elevations for Long Canyon exploration drill-hole collars range from 1900 to 2050 metres.

The lower slopes of the project area are covered by sagebrush, progressing up-slope to piñon and juniper woodlands typical of high desert mountain vegetation in northeast Nevada. Locally scattered subalpine fir, limber pine, and mountain mahogany are present at higher slope elevations, giving way to sagebrush and grasses on ridge tops. The majority of the Long Canyon exploration activities to date have been in tree-covered (piñon and juniper) areas on the lowermost, eastern slopes of the range.

The resource area lies on moderate to steep slopes that require road construction to develop drill sites and access.

5.4 Local Resources and Infrastructure

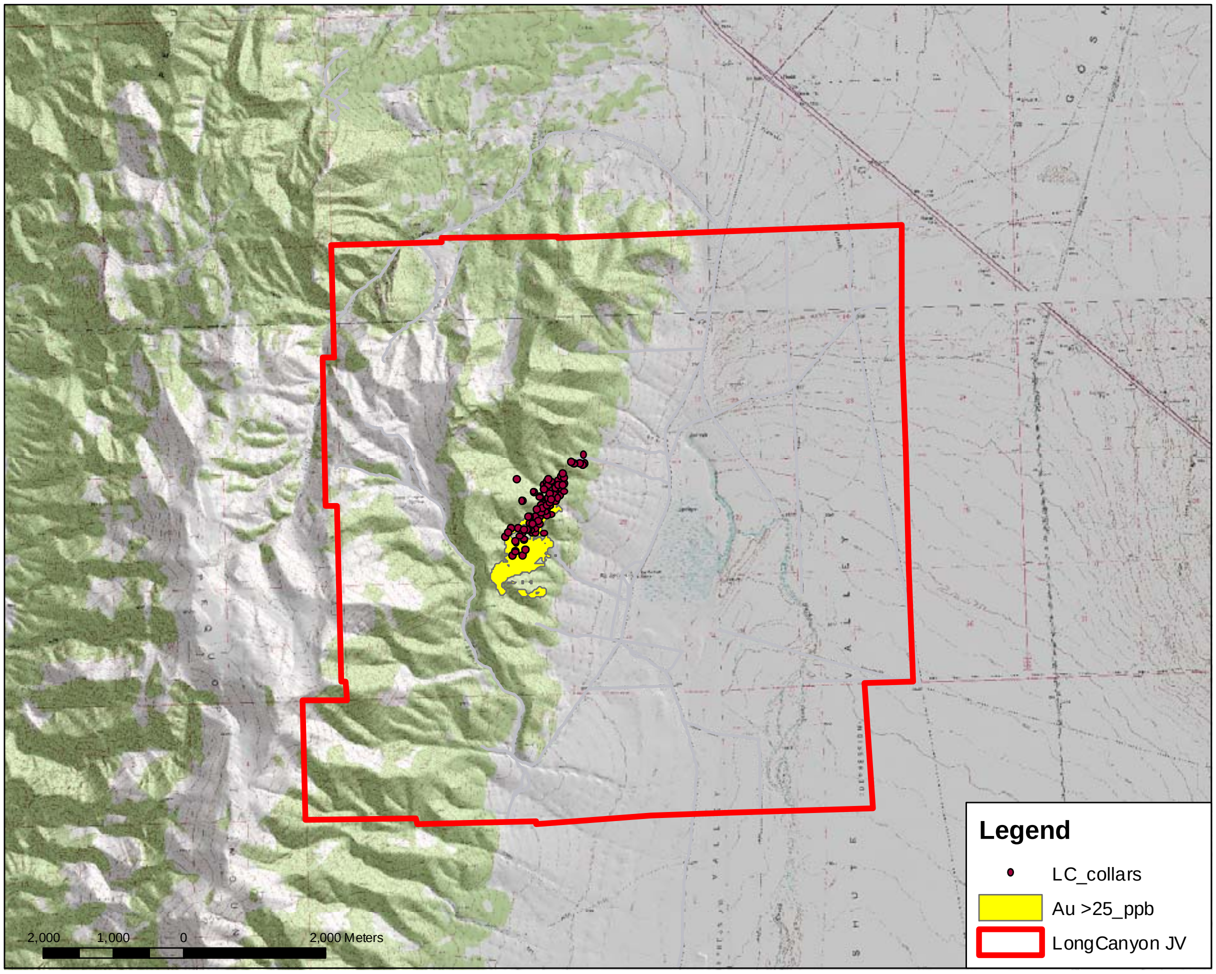
Reverse circulation ("RC") and diamond core drilling ("core") contractors, heavy equipment contractors, and field technical personnel to support continued exploration activities are all available from service companies and contractors in Elko, Nevada. Should an economic gold deposit be delineated on the Long Canyon project, experienced mining personnel and equipment suppliers are available in Elko as well as elsewhere in Nevada.

Electric power for domestic use extends to the Big Spring Ranch. The nearest major power grid is near an east-west rail line located approximately 15 kilometres north of the Long Canyon project, north of Interstate 80.

Water for drilling at Long Canyon is available from a well at the Oasis Truck Stop located 6.4 kilometres north of the project. Fronteer has a five-year lease with the owner of the truck stop to use water from the well to support the exploration activities. Fronteer has also obtained a temporary waiver from the Nevada Division of Water Resources authorizing the use of water from the Oasis well for mineral exploration drilling and dust control at the Long Canyon project. The agreement with Oasis also allows Fronteer to lease land for the purpose of establishing a field headquarters to support the Long Canyon project. Fronteer will locate up to four trailers at the Oasis truck stop. Electricity and telephone/internet service will be provided to the trailers.

Accommodations for field personnel are available in Wells, Nevada, the nearest town to provide food and lodging (Figure 4.1). The town of Wendover, located approximately 48 kilometres to the east on Interstate 80, is another alternative. There is no campsite or other housing facilities on the project. Fronteer is planning to locate up to four trailers at the Oasis truck stop.

Figure 5.2 Physiographic Map of Project Area
(Showing Drill-Hole Collars and Gold-In-Soil Anomalies)



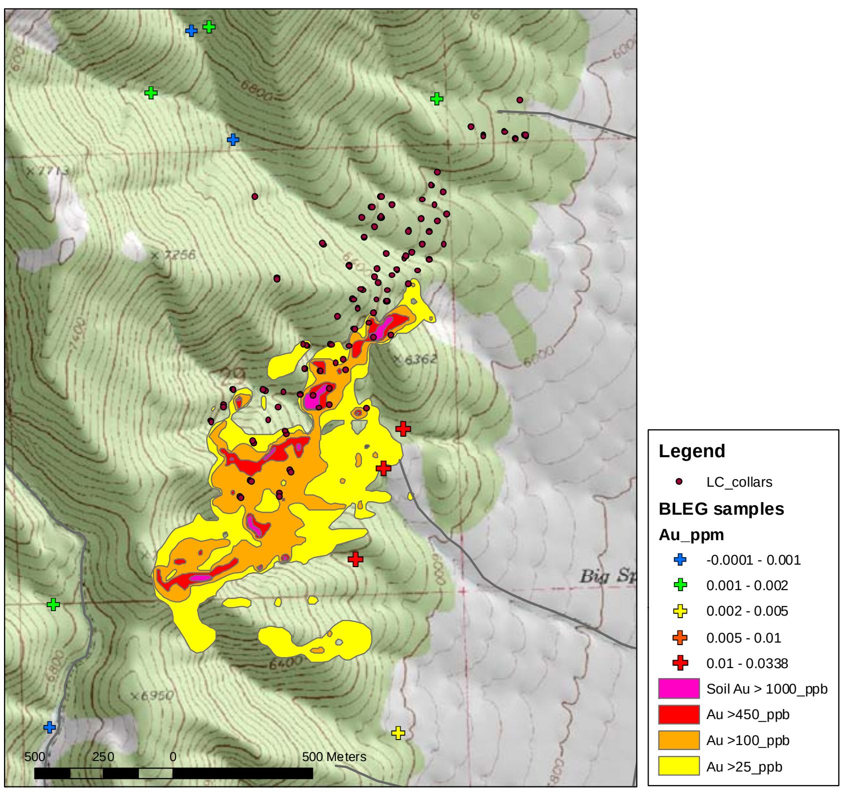
6.0 HISTORY

This section describes work conducted prior to formation of the Fronteer-AuEx Joint Venture in 2006. Work completed by the Joint Venture is described in subsequent sections of this report. Some specifics of the Pittston exploration program were provided by S. Green and S. Mason, former Pittston employees.

Aside from a few, small, historical lead-zinc prospect pits within the Long Canyon project area, there is no evidence of significant historical mining production.

Pittston conducted the first known modern gold exploration within the Pequop Mountains in 1994 when it conducted a regional Bulk Leach Extractable Gold ("BLEG") sampling program. This program returned anomalous gold from dry washes draining the western flanks of the Pequop Mountains. Pittston expanded this program to include the Long Canyon project area on the east side of the range in 1999. A number of BLEG samples in the Long Canyon region yielded anomalous gold (Figure 6.1).

Figure 6.1 Pittston BLEG Anomalies, 2000 Soil Anomalies, and Drill-Hole Collars



The detailed BLEG sampling was followed by prospecting up drainage and the discovery of gold-bearing jasperoids. Ridge-and-spur soil sampling followed, as well as soil sampling on a 61 metres x 61 metres grid up drainage from anomalous BLEG samples and over areas that yielded gold-bearing jasperoids. Pittston staked the first claims of record at Long Canyon in 2000. The soil sampling yielded a >25ppb soil anomaly over 1.5-kilometre long, elongate in a northeast direction (Figure 6.1). In addition to gold, multi-element ICP geochemical analyses showed anomalous arsenic, antimony, and mercury to be present in areas of anomalous gold. Rock chip sampling and road cut sampling were also done in advance of drilling.

Later in 2000, Pittston drilled seven RC holes, for a total of 1148 metres, to test the far northeastern portion of the soil anomaly. Five holes encountered weak gold mineralization, but the discovery hole, LC-03, encountered 21 metres averaging 2.7 g Au/t, including 3 metres averaging 5 g Au/t.

Pittston terminated exploration activities in the U.S. in December 2000. AuEx acquired Pittston in August 2004 and renewed exploration at Long Canyon in 2005, including mapping, surface sampling, road-cut sampling, and drilling. The drill program consisted of seven RC holes for a total of 768 metres. Significant gold mineralization was encountered in six of the seven holes.

In November 2005, Fronteer recognized that some of the claims controlled by AuEx at Long Canyon covered public surface lands but were underlain by private mineral rights owned by Fronteer and therefore were not open to mineral entry and staking. As a result, a Joint Venture agreement for the Long Canyon project was drafted between Fronteer and AuEx, with Fronteer contributing private mineral lands and AuEx contributing federal lode claims.

Fronteer has operated the Joint Venture and conducted all exploration at Long Canyon Property since May 23, 2006. Work completed by Fronteer for the Joint Venture is described in subsequent sections of this report.

6.1 Historic Mineral Resource and Reserve Estimates/Production

No historical resource or reserve estimations have been made at Long Canyon, and there is no known historical mineral production from the project or adjacent properties.

7.0 GEOLOGIC SETTING

7.1 Regional Geology

Most of northeast Nevada is underlain by carbonate and siliciclastic rocks that record a passive margin setting throughout most of the Lower Paleozoic, transitioning to a more active continental margin from the mid-Paleozoic onward. A major east-trending, crustal-scale fault known as the Wells Fault of unknown (post mid-Paleozoic) age, separates primarily platform and platform margin rocks on the south side of the fault (including most of the Pequop Mountains, shown in Figure 7.1) from platform margin and slope facies to the north. This separation suggests considerable (tens of kilometres) right-lateral offset across the fault. In the Long Canyon project area, Cambrian and Ordovician rocks record many cycles of sea level rise and fall, with periods of low sea level marked by dolomite horizons and sheets of cross-bedded orthoquartzite.

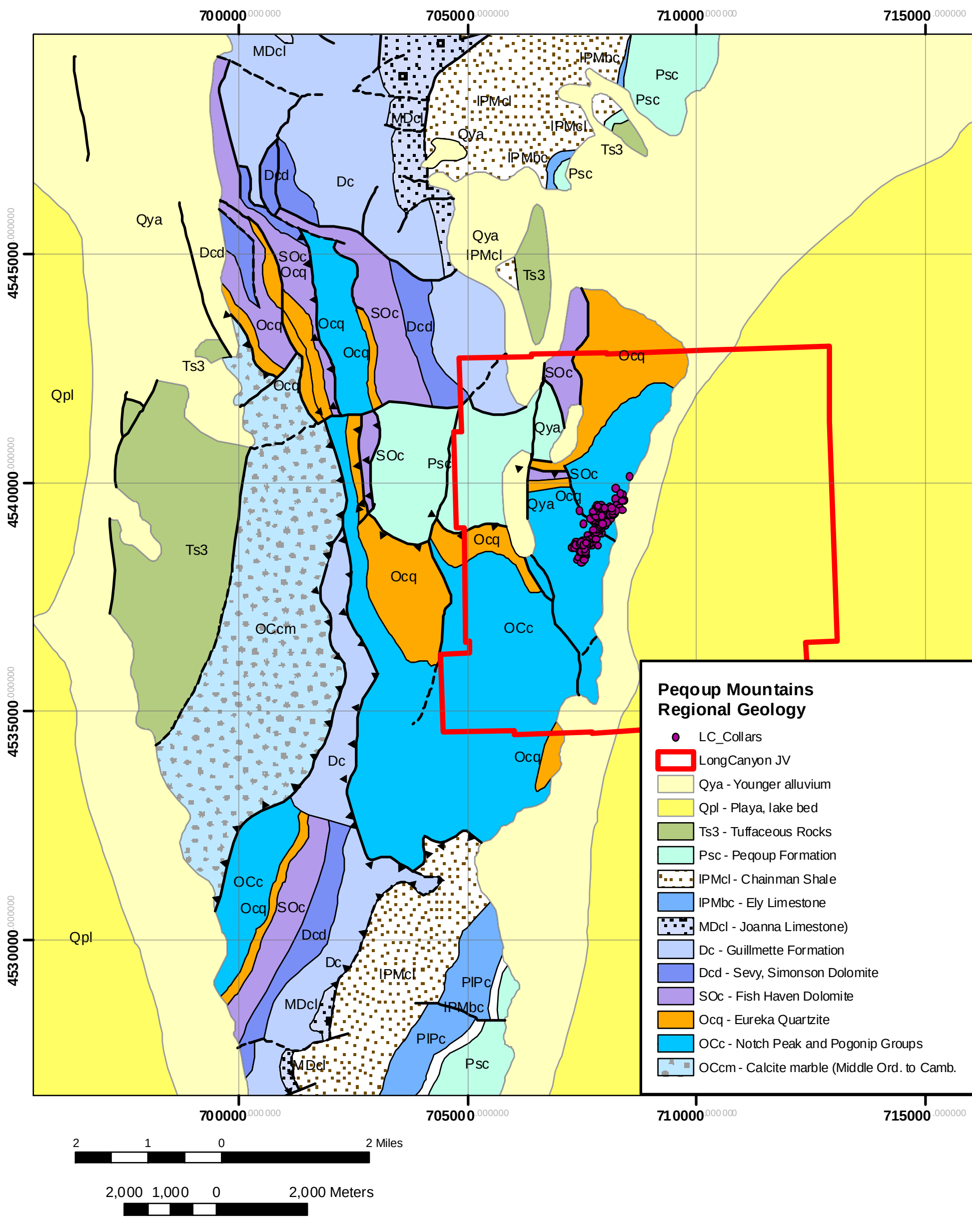
To the north of the Wells Fault, the Paleozoic section records the mid-Paleozoic Antler Orogeny in the form of the Roberts Mountains thrust fault and emplacement of deeper-water siliciclastic rocks of the Roberts Mountains Allochthon over platform and slope facies rocks. To the south of the Wells Fault, the Antler Orogeny is manifested by thick accumulations of foreland-basin sediments of Early Mississippian age that were shed eastward off the Roberts Mountains allochthon.

In mid-Jurassic time, rocks throughout northeastern Nevada and easternmost Utah were affected by the Elko Orogeny. The Elko Orogeny resulted in metamorphism and plastic deformation of primarily Lower Paleozoic strata over a large area. Manifestations include weak to strong, near-bedding-parallel foliation, northeast-trending folds, east-southeast-trending stretching lineations, and older-over-younger and younger-over-older layer-parallel faults (attenuation faults). Metamorphic effects are strong in the Wood Hills to the west of the Pequop Mountains, weaker in the western Pequop Mountains, and weaker still in the Long Canyon project area. The Elko Orogeny is presumed to be approximately coeval with mid-Jurassic plutonism in eastern Nevada.

The Tertiary Period includes a number of episodes of extension in the Great Basin, including Eocene volcanism and normal faulting and mid-Tertiary low-angle listric normal faulting. The latter includes periods of "hyperextension" from approximately 33 to 20 Ma, including the formation and unroofing of the Ruby Mountains Core Complex, located approximately 80 kilometres to the west. Rocks as young as 10 Ma in the eastern Great Basin are tilted up to 50° to the east, suggesting that low-angle normal faulting continued until fairly recently. High-angle basin and range faulting, resulting in the familiar pattern of mountain ranges and valleys, continues to the present. Most ranges, including the Pequop Mountains, are bounded by steep faults on one or both sides.

Gold occurrences in the eastern Great Basin are widely spaced and generally small, but most appear to be of the sediment-hosted type that is more prolific and well documented in the Carlin and Cortez Trends in the central Great Basin. Mineralization of this type was emplaced approximately 38 million years ago throughout the region, more or less coeval with two phases of felsic to intermediate volcanism in the region. Some examples are present in the vicinity of the Pequop Mountains, including the Tug and KB deposits, located to the northeast. Gold is also associated with mid-Jurassic intrusions in the region, including some or all of the mineralization at Bald Mountain, located to the southwest of Long Canyon.

Figure 7.1 Regional Geologic Map of Long Canyon Area



7.2 Property Geology

The following discussions are derived primarily from the mapping study completed by Smith (2009), which built upon earlier efforts by AuEx and Pittston. The reader is referred to unpublished company reports by consulting stratigrapher Jon Thorson (2007, 2008) for more details on the stratigraphy of the Notch Peak Formation and Pogonip Group. Previous mapping in the Long Canyon area was carried out by Thorman (1970), Camillari (1994), Coolbaugh (2006), and Pittston geologists, who provided a framework for subsequent work.

7.2.1 Local Lithology

The Pequop Mountains are underlain primarily by Paleozoic carbonate rocks and lesser siliciclastic rocks representing a transition from slope through platform facies over time (Figure 7.2). The Long Canyon project is underlain primarily by the Notch Peak Formation and the Ordovician Pogonip Group and Eureka Quartzite, with younger rocks (Fish Haven Dolomite and Pequop Formation) mapped on the northern boundary of the project area. Stratigraphic units presented in this report (Figure 7.3) reflect mappable subdivisions defined by Smith (2009) for regional mapping efforts.

Cambrian Candland Shale. Thinly bedded calcareous siltstone and silty limestone are exposed at the extreme south end of Long Canyon ridge. The strata, as well as the contact with the overlying Notch Peak Formation, are highly strained, but the contact appears to be depositional. These strata are tentatively assigned to the Candland Shale (Ccs) mapped elsewhere in the region based on discussions with Jon Thorson (pers. comm., 2008.)

Cambrian Notch Peak Formation. Cambrian carbonate rocks are widely distributed in the region, but are mostly referred to as “undifferentiated”. The name “Notch Peak Formation” is used to describe mainly massive limestone and/or dolomite in adjacent ranges to the east, and has been adopted here.

The lowest mappable unit in the Notch Peak (Cnp1) consists of a massive dolomite horizon approximately 20 to 30-metres thick exposed in the extreme south end of Long Canyon ridge. Overlying the massive dolomite unit in the southern part of the project area is a unit of unknown thickness (probably up to a few hundred metres thick) of fairly massive dolomite and limestone with 3 to 5-centimetres thick chert ribbons and nodules (Cnp2). Dolomite is suspected to be a secondary feature (late diagenetic, metamorphic, or possibly hydrothermal).

The Cnp2 unit grades upward into mainly limestone (Cnp3). This unit consists of an amalgamation of at least four shallowing-upward depositional cycles. Overall, however, the unit can be characterized by the predominance of fairly massive, medium- to thick-bedded, medium to pale gray, sparsely fossiliferous, finely crystalline limestone with areas of thinner, silty interbeds (Figure 7.4). Small-scale depositional features, including fossil hash, oolitic and oncolitic horizons, and rarely mudcracks, are noted locally. Several small dolomite lenses have also been mapped within the Cnp3 unit. Some appear to be derived from primary dolomitic deposits, while others appear to be related to alteration along fault zones or fold hinges.

The highest unit in the Notch Peak Formation consists of a thick (up to 70 metres) sequence of massive dolomite (Cnp4; Figure 7.5). This unit ranges from light to dark gray in colour, from coarse to (rarely) fine grained, and from massive to (rarely) well bedded, probably reflecting degree of secondary recrystallization. The best-preserved examples are typically dark gray, relatively fine-grained, oncolitic, and fetid when broken. In most areas, however, the rocks are paler gray, massive and jointed to weakly brecciated, with areas of “zebra” texture.

Figure 7.2 Long Canyon Project Geologic Map

(after Smith, 2009)

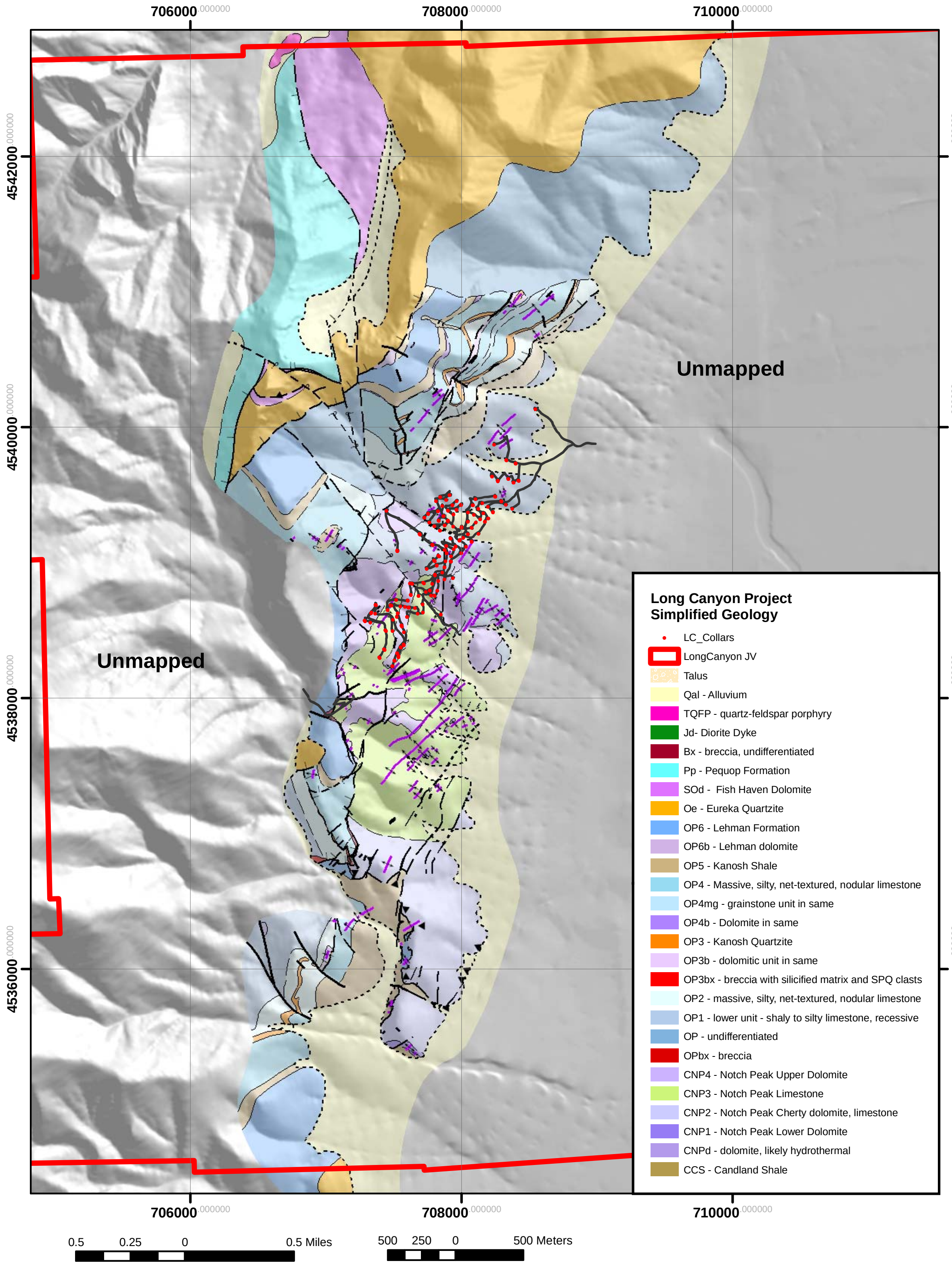


Figure 7.3 Stratigraphy of the Long Canyon Project Area
(after Smith, 2009; Thorson, 2007, 2008)

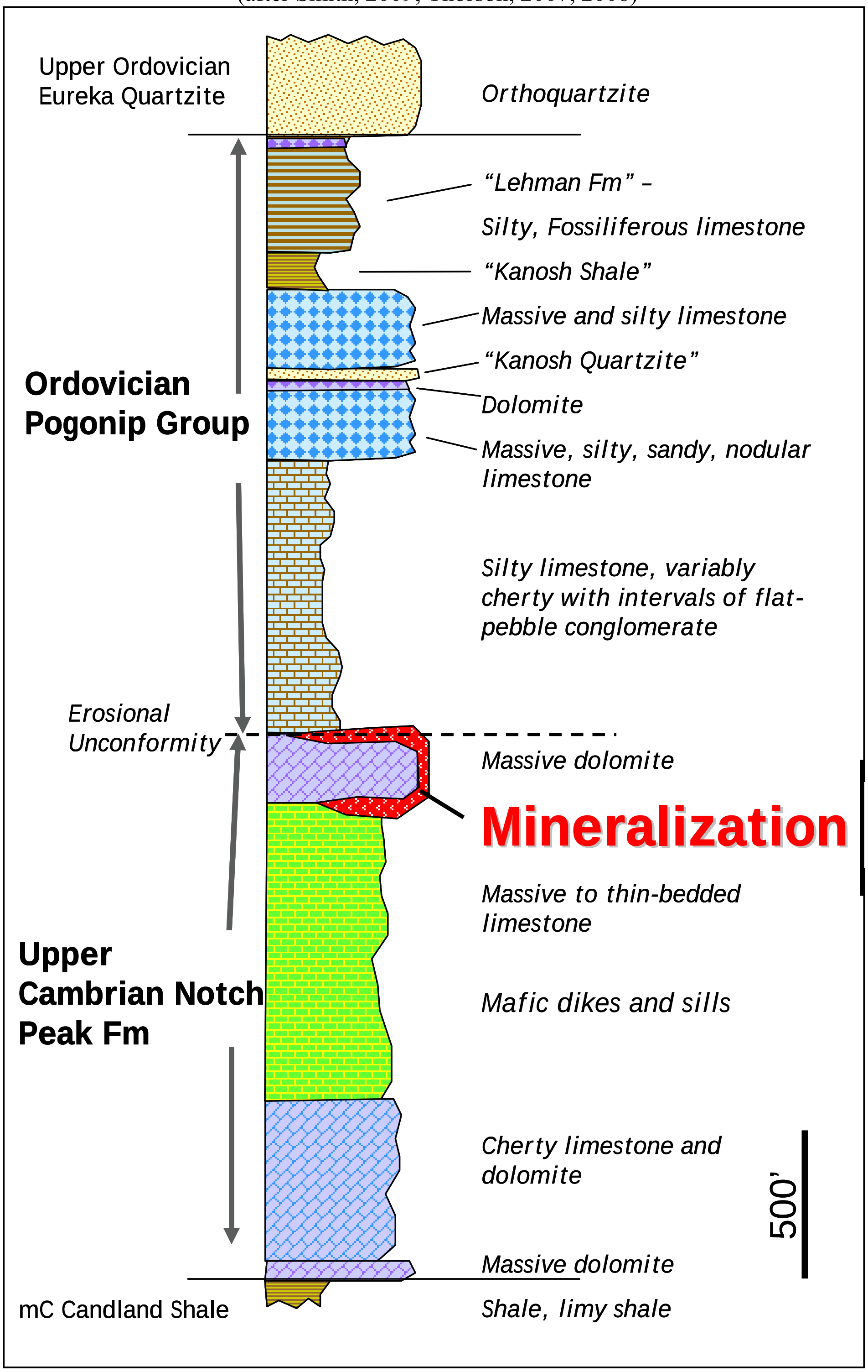


Figure 7.4 Notch Peak Formation Limestone (Cnp3)

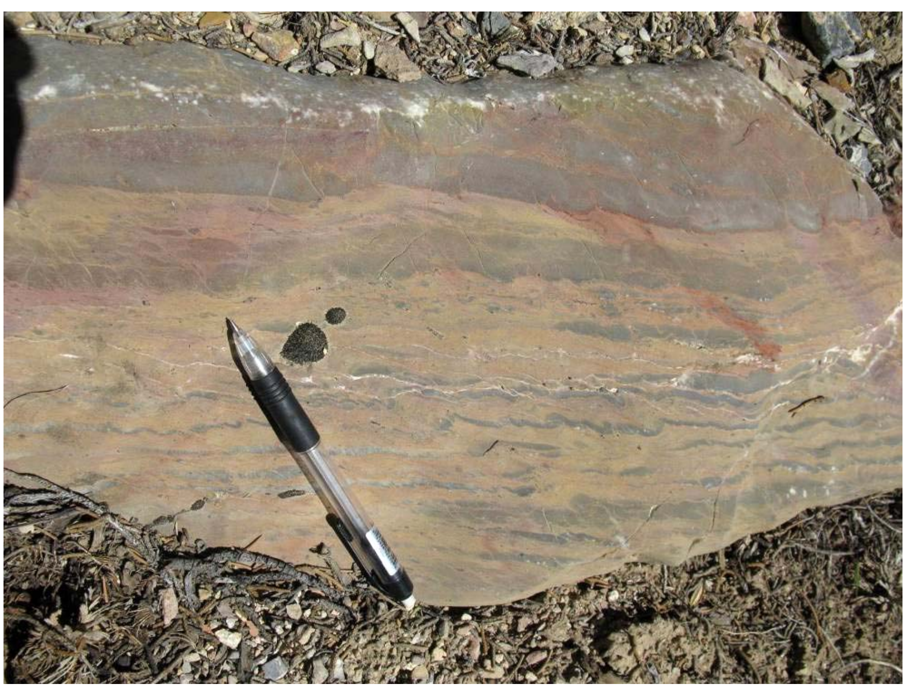
Figure 7.5 Notch Peak Formation Dolomite (Cnp4)

Ordovician Pogonip Group. Following the deposition of the Notch Peak Formation, there was likely an emergent period (global sea level low-stand) spanning up to several million years, represented by an erosional unconformity and local areas where a paleosol and/or breccias are present between the top of the Notch Peak Formation and the base of the Pogonip Group.

The Pogonip Group in the map area is suspected to be up to 600 metres thick, and on the scale of the mapping for this report, is comprised of six main units and several sub-units. Nomenclature varies considerably throughout the region, likely a result of facies changes and the formation's broad regional extents (from eastern California to western Utah). Thorman (1970), following Hintze (1951), divided the Pogonip Group in the Wood Hills and Pequop Range into four formations, which include (from lowest to highest) the Wahwah and Juab Limestones, Kanosh Shale, Lehman Formation and Crystal Peak Dolomite. The Wahwah and Juab Formations are also known as the Garden City Formation in the Toano Range. In the Toano Range, a quartzite referred to as the Swan Peak Quartzite occurs between the Lehman Formation and the Crystal Peak Dolomite. Smith (2009) used a numbering system based on units felt to be consistently and reliably applicable in the field at the scale of mapping (approximately 1:2400).

The basal unit of the Pogonip Group in the Long Canyon area (Op1) is the host for much of the mineralization in the Long Canyon deposit, and consists of recessive, thin-bedded, silty limestone (Figure 7.6) with thicker (up to 1 metre thick) interbeds. Limestone ranges from medium gray to buff and typically weathers in a platy, rounded habit. Chert comprises approximately 5% of the lower part of this unit. Thicker beds are often conglomeratic, with tabular limestone clasts in a sandy (grainstone) matrix. Near the top of the section in the north, Op1 is very recessive and poorly exposed, covered by an apron of talus from the overlying, cliff forming unit Op2. Unit Op1 is subdivided into a basal chert-bearing unit and an overlying silty unit in drill logging.

Figure 7.6 Silty, Thin-bedded to Laminated Limestone of Lower Pogonip Group (Op1)



Unit Op2 is a massive, cliff-forming unit exposed mainly in the northern part of the map area. The unit consists of massive beds of heavily burrowed limestone. Burrow fill consists of tan-weathering, partly dolomitic, silty, buff-coloured, partially silicified limestone, giving the rock a "net-textured" or nodular appearance.

Unit Op3 consists of approximately 15 metres of white, cross-bedded quartz arenite. In the Wood hills, this quartzite is named the "Kanosh Quartzite" by Thorman (1970.)

Unit Op4 is similar in nature to unit Op2, consisting of fairly massive, burrowed, "net textured" to nodular, silty limestone, as well as massively bedded limestone with minor wispy silt laminae, cherty limestone, and grainstone.

Unit Op5 consists of a very recessive weathering shale horizon, known regionally as the "Kanosh Shale". The Kanosh Shale is rarely exposed, and is usually defined by a zone of gray- to olive-weathering shale and thin-bedded silty limestone float with very minor outcrop of thin-bedded, silty limestone. Shale typically displays a slaty cleavage at low angles to bedding.

Unit Op6 consists mainly of massive gray limestone with 20% to 70% buff to red silt "wisps". Silt wisps were likely continuous silty beds, which have been deformed into a series of rootless isoclinal folds on a centimetre scale.

Ordovician Eureka Quartzite. The Ordovician Eureka Quartzite caps the higher ridges above and to the north and west of the Long Canyon deposit. The Eureka quartzite consists of white to pale gray, hard, massive, variably cross-bedded orthoquartzite, and exceeds 100 metres in thickness in this area. The contact with the underlying Pogonip Group is usually covered by thick talus. Where exposed, quartzite near the base of the unit is often brecciated and re-healed with silica, suggesting the bottom contact may be modified by low-angle, layer-parallel faulting.

Units present in the Long Canyon project area above the Eureka Quartzite include the Late Ordovician to Silurian Fish Haven Dolomite and the Permian Pequop Formation.

Pre-Middle Jurassic Mafic Sills and Dikes. Thin dioritic to lamprophyric(?) sills and possibly dikes are present throughout the map area, usually as rubble trains. Most of the sills are likely less than (and mostly substantially less than) one-metre thick. Sills are fine to medium grained and variably porphyritic. They are invariably altered, with alteration ranging from regional metamorphic effects of low greenschist facies (chlorite-muscovite-phlogopite) to propylitic, argillic, or phyllic altered in mineralized zones. Secondary biotite is suspected in some areas. Sills range from nearly undeformed to schistose, the latter suggesting that they may pre-date mid-Mesozoic(?) ductile deformation, or that there may be more than one phase of intrusion. Whole-rock data from variably altered samples shows silica content as low as 38%, suggesting that the intrusive rocks may be lamprophyres.

Quaternary/Holocene Unconsolidated Deposits. Lower elevations of the map area are covered by alluvium, characterized by the presence of relatively rounded boulders (up to several metres in diametre) of Eureka Quartzite, as well as a diverse range of other lithologies. IP resistivity data suggest that the alluvial deposits thicken gradually basinward, and then thicken abruptly on the east side of a high-angle Basin and Range fault.

7.2.2 Structure

The structural history of the Long Canyon area was elucidated primarily through geological mapping, examination of drill core, and research.

The structural history of the Long Canyon area is complex, with at least four deformational events. These events are generally not well described or dated in the eastern Great Basin, but some tentative correlations can be made between regional and local events. Strata throughout the area are characterized by a penetrative fabric at low angles to bedding, local areas of tight to isoclinal, intrafolial folds on a centimetre scale, development of a southeast-plunging stretching lineation, northeast-trending folds, and boudinage, on a regional scale, of brittle dolomite units. The ductile deformation event that created these structures is attributed to the Jurassic Elko Orogeny.

Northeast-trending folds include open to tight and upright to overturned folds. All fold the foliation, but some appear to be fairly ductile in nature, while others range from tight folds to kink folds. A northeast-plunging crenulation lineation is present locally. Two roughly coaxial phases of folding are suspected.

Faults range from early, ductile, older-over-younger and younger-over-older low-angle faults, to more brittle low-angle to moderate-angle reverse and normal faults, to late brittle northwest- and northeast-striking faults.

The deformational history is described below in a spectrum from older, more ductile deformation to younger, more brittle deformation.

Early (Jurassic?) Ductile Deformation. The Early Jurassic Elko Orogeny was defined by Thorman et al. (1991), although the existence of ductilely deformed rocks in the eastern Great Basin has been documented for several decades by many different researchers. The lines of evidence that are most compelling in terms of documenting a mid-Mesozoic orogenic event in the eastern Great Basin are: 1) ductile folds and other fabrics in rocks as young as early Mesozoic are cross-cut by approximately 155 Ma intrusive rocks in several mountain ranges; and 2) the presence of the Morrison Formation, comprising one thousand metres or more of terriginous sediment of mid- to Late Jurassic age, in Utah and Colorado, interpreted as foreland-basin sediments shed off the Elko orogenic highland.

The earliest deformation documented in the Long Canyon area is manifested by variable development of a penetrative cleavage or foliation in all calcareous or dolomitic rocks. Foliation is defined by a slaty to phyllitic cleavage in silty or shaly rocks, or by recrystallization of calcite or dolomite in more massive rocks. The foliation typically is parallel to or slightly discordant to bedding in thin-bedded, shaly or silty units, and refracts and is more discordant in massive or thick-bedded units. It is only weakly developed in dolomite, and is absent in quartzite. Locally, such as along the lower contact of the dolomite unit (Cnp4), the foliation is particularly strongly developed. This deformation is locally accompanied by a NW-SE to WNW-ESE stretching lineation in the plane of the foliation.

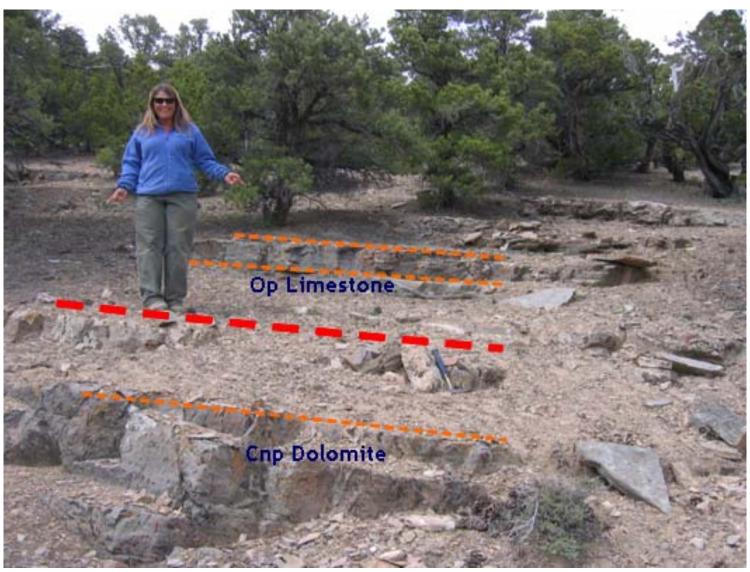
The most profound manifestation of the Elko Orogeny in the Long Canyon area consists of boudinage of the thick, brittle dolomite horizon at the top of the Notch Peak Formation. The development of these dolomite boudins created structural/stratigraphic settings that were critical to the localization of the Long Canyon mineralization. The boudinage is interpreted by examination of mapped outcrops, drill intercepts, and observation of bedding and foliation directions both internal and external to the boudins.

At the top or the bottom of a boudin, bedding in the dolomite and overlying or underlying limestone is parallel or subparallel, and generally dips gently to the southeast (Figure 7.7). Along a block nose (the terminated end of a boudin), the bedding/foliation in the enveloping limestone wraps around the nose and may be vertical or locally overturned, whereas the bedding in the dolomite remains unchanged (Figure 7.8 and Figure 7.9). Bedding in the dolomite unit is difficult to discern close to a block nose as the dolomite is typically recrystallized, strongly jointed, and locally brecciated.

Boudins are irregular in shape, although boudin necks (the area between adjacent boudins) generally trend north to northeast, perpendicular to the stretching lineations. The thin-bedded basal Pogonip limestones are often highly folded and contorted along the limestone-on-limestone contacts in the boudin neck areas. Where the boudins are covered by the Pogonip Group, boudin necks in the subsurface can be traced for some distance by mapping of north- to northeast-trending synclines in the lowermost Pogonip Group rocks.

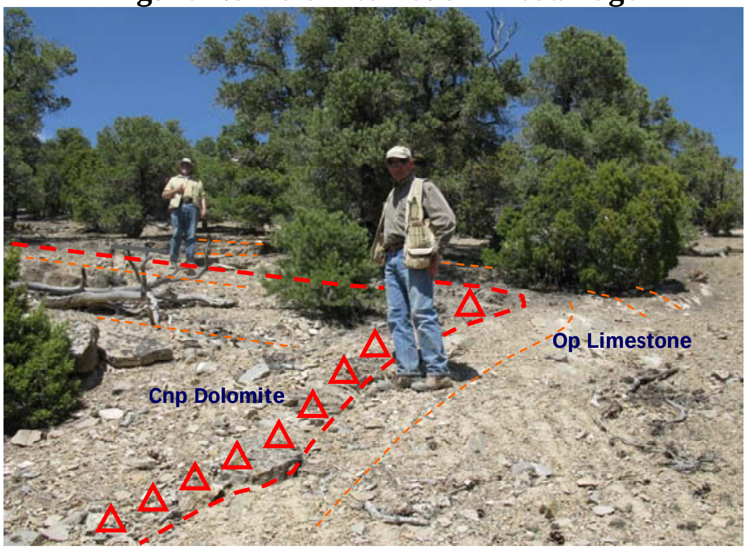
Folding associated with the Elko Orogeny in the Long Canyon area appears to be in large part controlled by the megaboudinage of the Notch Peak dolomite. The largest folds in the area occur in the Notch Peak Formation limestone, where boudin necks accommodate the limestone by formation of open, ductile, upright anticlines, and to a lesser extent in the overlying Pogonip Group, where boudin necks accommodate the limestone by formation of upright synclines. Hinge areas are rounded and they tend to be massive. Bedding and foliation are difficult to discern, possibly due to recrystallization. The foliation is folded, suggesting that the folding event happened later than initial foliation of the rocks. No secondary axial planar cleavage is discernable in these folds.

Figure 7.7 Top of Dolomite Boudin Block



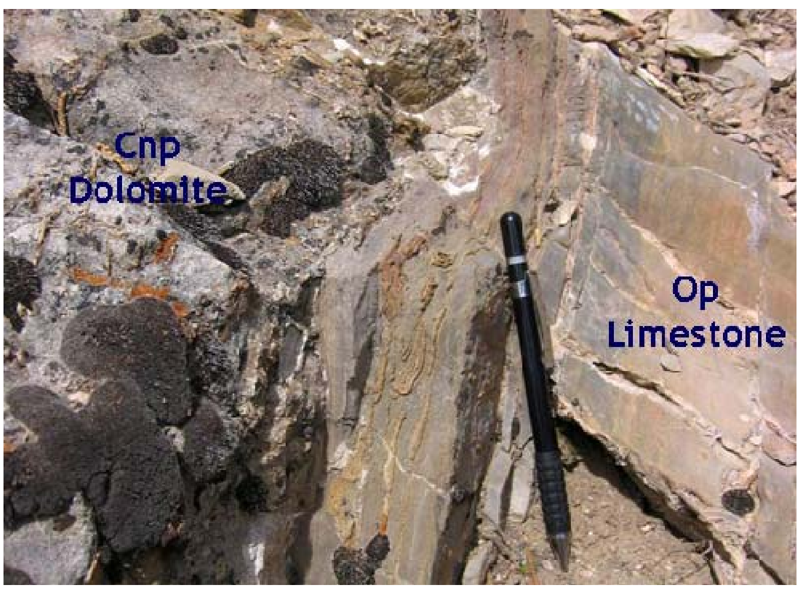
(Note that bedding and foliation (orange) are parallel to the contact between the Cnp dolomite and Op limestone).

Figure 7.8 Dolomite Boudin Nose/Edge



(Bedding in the Cnp dolomite is truncated, whereas bedding/foliation in the Op limestone is folded over the boudin nose.)

Figure 7.9 Dolomite Boudin Nose Contact



(Op limestone is highly strained, with near-vertical orientation of foliation.)

The basal part of the Pogonip Group in the boudin necks and along boudin noses is characterized by tight folding on a centimetre scale, with the foliation axial planar to the folds.

Open upright folds and intrafolial folds described above are affected by a later, roughly coaxial phase of folding that is more brittle in nature. These folds, which occur primarily in units immediately above and below the Notch Peak dolomite, have more angular hinge areas than the early, open folds, and a weakly developed axial planar cleavage. These folds may in part represent "tightening" of the axial areas of earlier folds as deformation progressed. The late fold set is also manifested as a northeast-trending crenulation lineation locally visible in the plane of foliation where the foliation is developed in silty rocks.

Bedding-parallel thrust faults and attenuation faults have also been noted within the project area.

Post – Jurassic Deformation. Structures attributed to post-Jurassic tectonism are generally brittle in nature. These may be in part associated with the Late Cretaceous Sevier Orogeny. Structures noted in the project area include:

- Moderate-angle, west-northwest-dipping reverse faults;
- Low to moderate-angle, west-dipping normal faults;
- Tight folds with northeast-plunging axes and variously oriented axial planes;
- Northeast-trending, high-angle breccia zones.

Brittle structures noted within the drilled area described below.

North- to northwest-trending high-angle faults are believed to be common in the map area, although they tend to occupy gullies and rarely outcrop. These faults can be observed primarily on ridges with good exposures or where they cut either the Kanosh Quartzite or Eureka Quartzite, in which cases offsets can be mapped and the fault planes are silicified and/or contain quartzite clasts. Offset along the faults is variable, but rarely over a few tens of metres. The North Fault, mapped on surface and in drill holes, may be affiliated with other northwest- to north trending faults in the area. This fault exhibits down-to-the-east displacement of a few tens of metres as measured by offset of one of the dolomite blocks. It is believed to be post-mineralization.

The latest phase of faulting in the Long Canyon area is represented by a large, north-trending, range-bounding normal fault along the eastern edge of the project area. The existence of this fault is inferred by: 1) the presence of a large basin; 2) a linear trend of artesian springs; and 3) gravity and IP data suggesting a dramatic thickening of basinal sediments over a short distance.

Two major joint sets are evident in the region: northeast-trending and steep, approximately parallel to the axial planes of most folds in the region, and northwest-trending and steep, parallel to northwest-trending high-angle faults in the region. The former joint set is essentially parallel to weakly developed axial planar cleavage in second-phase folds, as well as northeast-trending faults/breccia zones.

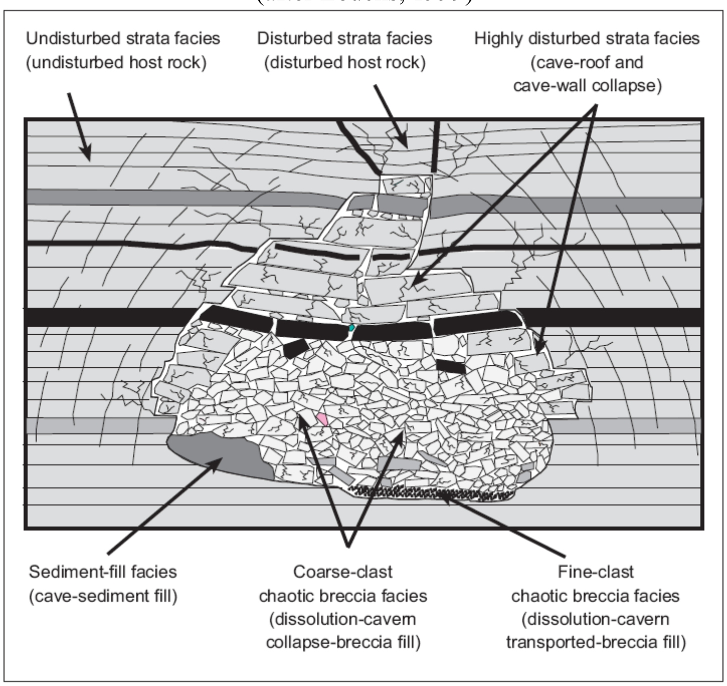
Pressure solution features (stylolites) are noted throughout the region. They are most noticeable in drill core from deformed areas in the Notch Peak Limestone, such as fold hinges. In these areas, stylolites concentrate hematitic silt and are very irregular in orientation. The presence of stylolites in otherwise fairly massive limestones suggests appreciable volume loss and deformation due to pressure solution. Multiple phases of stylolite formation are likely represented and could be of any age(s).

7.3 Karst Breccias

Evidence for control of mineralization in and around dissolution collapse features is substantial and deserves special mention. Karst is generated by chemical erosion of limestone by slightly to strongly acidic water that can be meteoric or hydrothermal in origin. It can result in the formation of extremely irregular topography, sink holes on a metre to kilometre scale, and elaborate cave systems that can stretch for tens of kilometres. Karst terrain and caves can be highly irregular in form, although most are at least partially controlled by structures (joints, faults, *etc*.) and/or stratigraphy.

Idealized dissolution collapse features, which are believed to be present at Long Canyon, are shown in Figure 7.10

Figure 7.10 Idealized Cross Section of a Karst Cave with Dissolution Collapse Breccia
(after Loucks, 1999)



In the case of Long Canyon, the distribution of caves (or cave fill/dissolution breccias) appears to be largely controlled by the dolomite boudin margins, as well as limestone-on-limestone contacts in the boudin necks. Evidence for meteoric and hydrothermal karsting and dissolution collapse breccias at Long Canyon is well documented. Karsted areas may have one or more of the following characteristics:

- Crackle breccias (monomictic, angular, usually calcite cemented, and "jigsaw fit" breccias).
- Dissolution collapse breccias.
- Polymictic to monomictic breccia types.
- Matrix supported breccias.
- Range from nearly 100% coarse calcite cement to nearly 100% matrix hematitic silt/clay material, rarely silicified.

- Clasts (particularly massive limestone) variably rounded and embayed, suggesting erosion by acidic fluids.
- Clasts ranging from virtually unaltered to strongly decalcified and hematitic.
- Matrix ranging from foliated and fairly well indurated (indicating that some karsting predated metamorphism) to unconsolidated mud.
- Fine-grained cave fill (clay to silt, hematitic, rare laminations or spelothems), ranges from uncemented (basically mud) to calcite or silica cemented.

Figure 7.11 shows a cross section through a dissolution collapse-breccia system (karst) as illustrated with selected drill core from Long Canyon (different holes represented).

Figure 7.11 Core Representing Mineralized Dissolution Collapse-Breccia System

8.0 DEPOSIT TYPE

The gold mineralization at Long Canyon is best described as sediment-hosted, Carlin-type gold mineralization. Carlin-type gold deposits are a class of gold deposits that are not unique to Nevada, but exist in far greater numbers and total resource size in northern Nevada than elsewhere in the world. They are characterized by concentrations of very finely disseminated gold in silty, carbonaceous, calcareous rock. The gold is present as micron-size to sub-micron-size disseminated grains, often internal to iron-sulfide minerals (arsenical pyrite is most common) or with carbonaceous material in the host rock. Free particulate gold, and particularly visible free gold, is not a common characteristic of these deposits; significant placer alluvial concentrations of gold are therefore not commonly produced when Carlin-type gold deposits are eroded.

All the Carlin-type deposits in Nevada have some general characteristics in common, although there is a wide spectrum of variants. Anomalous concentrations of arsenic, antimony, and mercury are typically associated with the gold mineralization; thallium, tungsten, and molybdenum may also be present in trace amounts. Alteration of the gold-bearing host rocks of Carlin-type deposits is typically manifested by decalcification of the host, often with the addition of silica, addition of fine-grained disseminated sulfide minerals, remobilization and/or the addition of carbon to the rock, and late-stage barite and/or calcite veining. Small amounts of white clays (illite) can also be present. Decalcification of the host produces volume loss, with incipient collapse brecciation, which enhances the fluid channel ways of the mineralizing fluids. Due to the lack of free particulate gold, Carlin-type deposits generally do not have a coarse-gold assay problem common in many other types of gold deposits.

Deposit configurations and shapes are quite variable. Carlin-type deposits are typically somewhat stratiform, with mineralizing characteristics being best exhibited in specific stratigraphic units, although steeply dipping faults can host high-grade gold mineralization. Breccias can also be primary hosts to mineralization.

The mineralization identified at Long Canyon shares many of the characteristics of Carlin-type gold mineralization, including:

- Stratigraphic control on mineralization - mineralization is hosted primarily in limestone, particularly in silty, thin-bedded units;
- Structural control on mineralization - mineralization occurs in karstic cavities, collapse breccias, and anticlinal fold hinges;
- Geochemical association - elevated arsenic, mercury, antimony, and thallium accompany the gold mineralization, while silver and base-metal concentrations are low; and
- Alteration - mineralization is associated with decalcification, silicification/jasperoid, oxidized variants of pyrite and arsenical pyrite or arsenopyrite, and clay alteration.

The Long Canyon project also displays some characteristics that are unlike typical Carlin-type gold deposits. The prevalent association of hematite with gold mineralization at Long Canyon is not a common characteristic among all Carlin-type deposits, although this phenomenon is associated with weathered/oxidized portions of some of the deposits. The general location of the project is outside the known major gold deposit trends in Nevada. Host rocks are Cambrian-Ordovician platform to platform-margin carbonates, whereas the majority of Nevada Carlin-type deposits are in Ordovician-Devonian platform margin and slope rocks. Finally, mineralization is hosted in plastically deformed rocks and is associated with boudinage structures.

9.0 MINERALIZATION

Four northeast-trending zones of mineralization have been identified to date at Long Canyon (Figure 9.1), each corresponding to a particular dolomite-boudin environment.

The Discovery Zone (Figure 9.2 and Figure 9.3) outcrops in the southeastern limits of the resource area and extends 1,100 metres to the northeast where the mineralization remains open. This zone includes significant mineralization related to a boudin neck and its associated boudin noses.

The West Zone (Figure 9.2) has a strike length of 275 metres at present and consists of mineralization related to the east-facing nose of the westernmost boudin block encountered to date in surface mapping and drilling. Narrow, steeply dipping zones of mineralization related to lamprophyric dikes and sills also occur in this zone.

The north-trending Shadow Zone (Figure 9.3) is located west of the northern part of the Discovery Zone and has a sharp truncation on its southern end. Like the Discovery Zone, the Shadow Zone mineralization is related to a boudin neck and associated boudin noses.

The Crevasse Zone mineralization (Figure 9.3 and Figure 9.4) appears to be related to an incipient boudin, where the dolomite block is broken but has not completely separated. The Crevasse Zone has a northerly trend and lies below unmineralized Pogonip Group cover. Few holes have been drilled into this high-grade zone, and the mineralization remains open.

Geological controls to the Long Canyon mineralization are both stratigraphic and structural. Gold occurs primarily within three structural/stratigraphic settings, listed in order of decreasing importance:

- Along all contacts of dolomite boudin blocks, especially at and near the noses of the boudins (see discussion of boudinage formation in Section 7.2.2;
- The contact between the thinly bedded silty limestone (Op1) of the lowermost Pogonip Group and thin-bedded limestone of the uppermost Notch Peak Formation, where these units have been brought into structural juxtaposition by removal of the dolomite unit along the boudin necks; and
- Stratabound mineralization within what may be favourable limestone bed(s) in the upper Notch Peak Formation.

Significant karsting, likely both meteoric and hydrothermal in origin, is localized primarily in the limey units at their contacts with dolomite at boudin margins, noses, and necks, in some areas resulting in large, silt-filled collapse cavities (see Section 7.3). Much of the higher-grade mineralization at Long Canyon is hosted in the hematitic matrix of dissolution collapse breccias associated with karst processes. Mineralized areas discovered to-date are essentially entirely oxidized.

Mineralization is often stratiform when not hosted within solution collapse breccias. Lamprophyric sills are commonly associated with mineralization in some areas, although they likely are older than the gold mineralization and act as receptive host rocks. It is not yet known what role faults may play in the location of the gold.

Thin sections of mineralized Notch Peak Formation show gold occurring as submicron particles at the margins of oxidized pyrite grains suspected to be authigenic in origin. Some gold grains were observed encapsulated in silica. Gold was also detected by an SEM (scanning electron microscope) analysis of an arsenical rim on one pyrite grain.

Figure 9.1 Simplified Geological Map Showing Drill Holes and Mineralized Zones

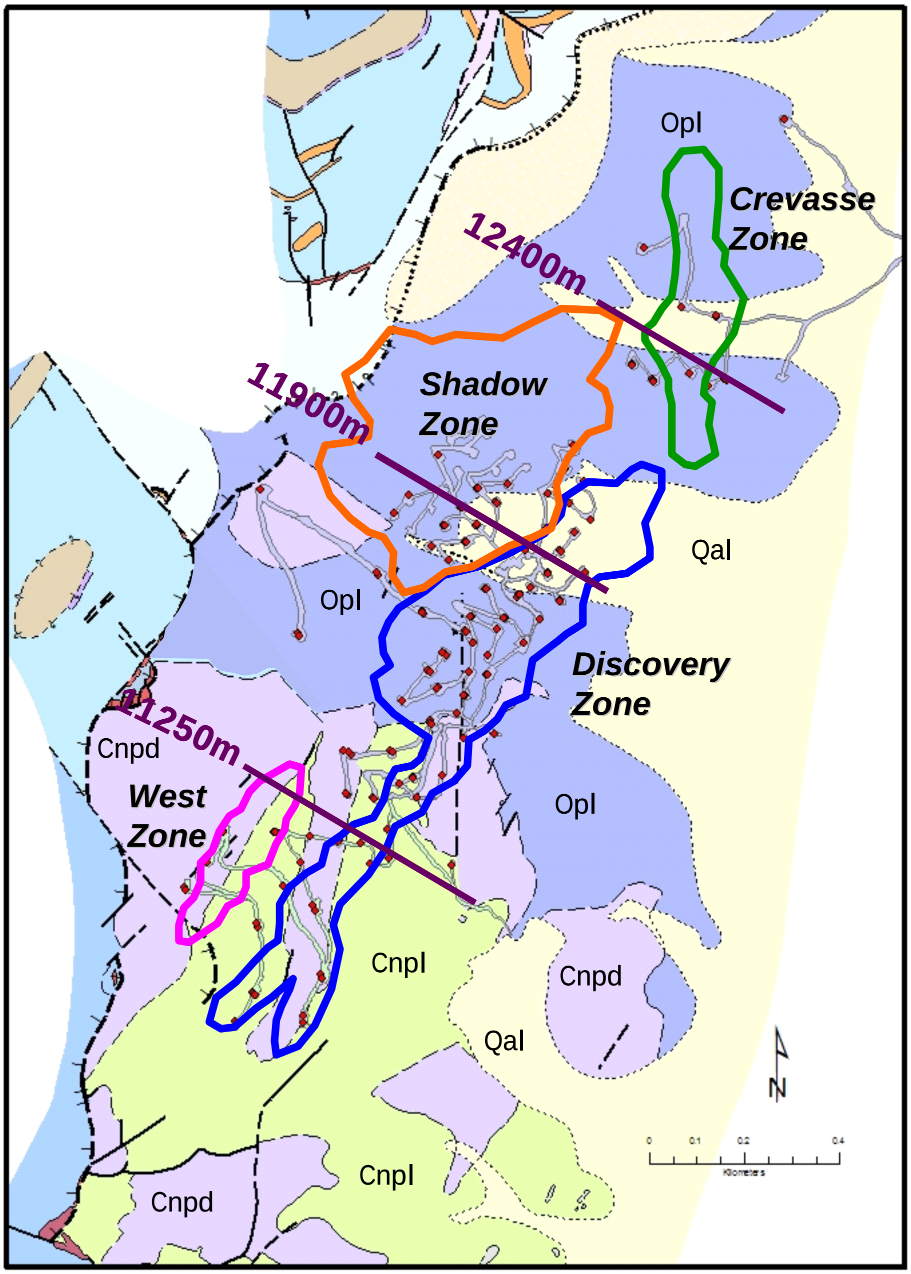


Figure 9.2 Section 11250 Showing the West and Discovery Zones

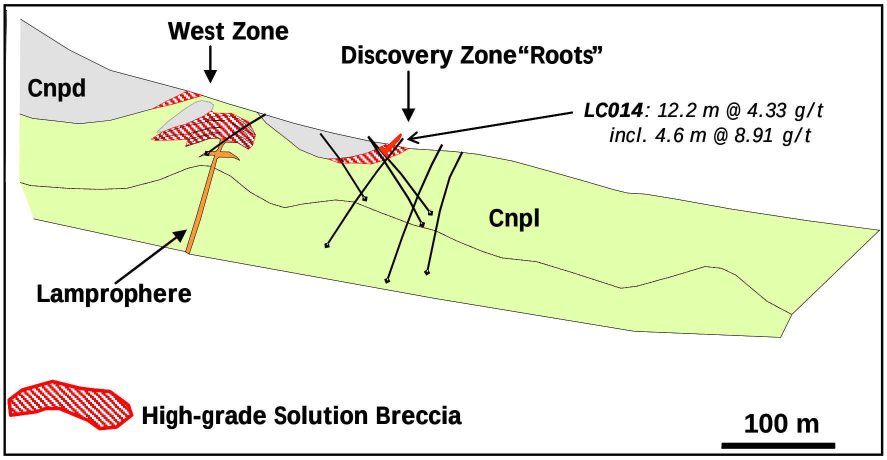


Figure 9.3 Section 11900 Showing the Shadow, Discovery, and Crevasse Zones

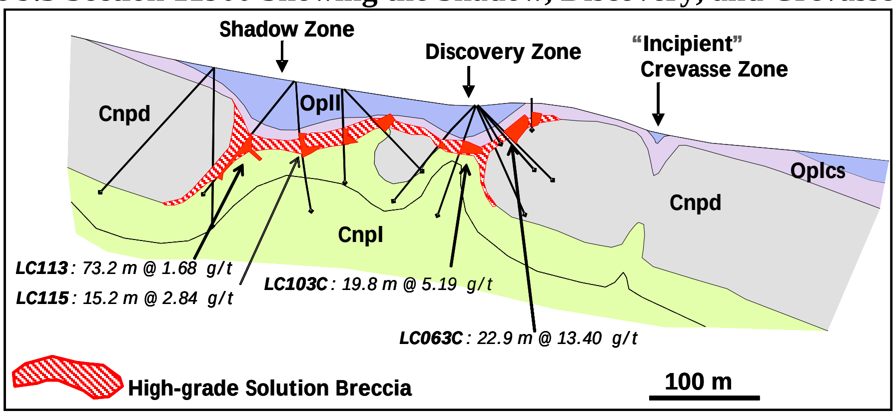
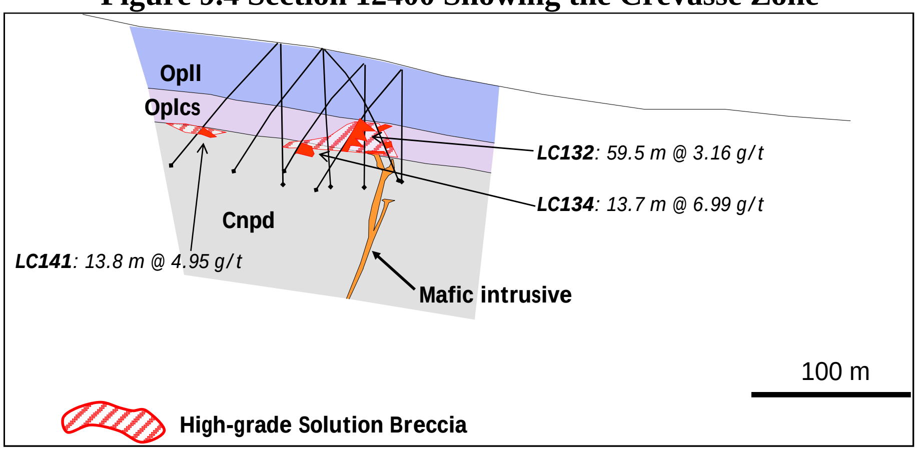


Figure 9.4 Section 12400 Showing the Crevasse Zone



9.1 Alteration

Principal alteration minerals that are associated with gold mineralization include hematite, jarosite, scorodite, silicification, and illite. Rocks in the deposit area are essentially entirely oxidized, so inferences regarding the nature of primary mineralization must be made based on examination of oxidized rock.

Decalcification. Decalcification shares a strong spatial association with mineralization. Decalcification is preferentially developed in silty, thin-bedded to laminated strata in the lowermost Pogonip Group, but may also be present locally in the Notch Peak Formation. Decalcification imparts a buff colour and soft, chalky appearance to the rock. Some "sanding" observed in dolomite may represent decalcification of limy matrix to dolomite grains.

Silicification. Evidence from examination of a limited number of polished thin sections and whole-rock geochemical data suggest that weak, pervasive silicification is an important alteration type at the Long Canyon project, and is associated with gold mineralization. Silicification of this type is not obvious in hand sample. Silicification is present as small, ragged grains in limestones, with up to 50% of the rock replaced by silica.

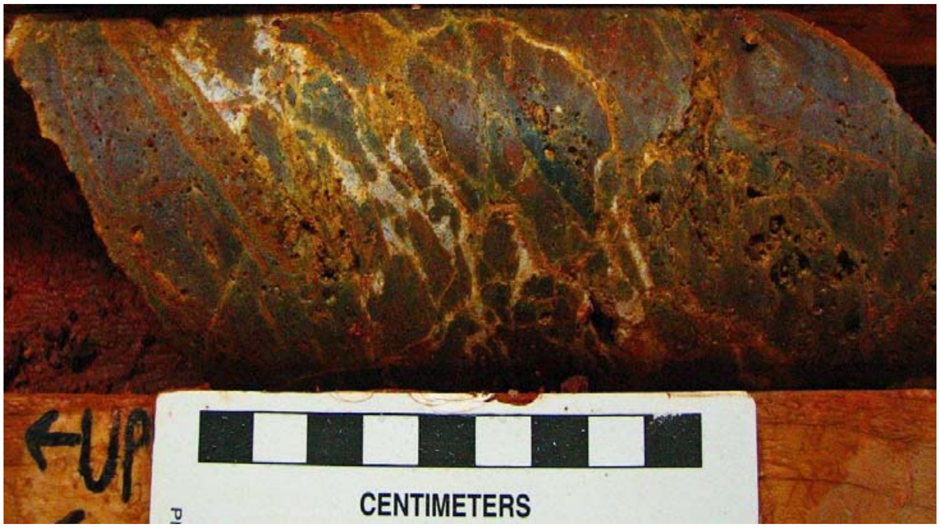
Jasperoid. Jasperoid is relatively rare and largely restricted to the West Zone and the as yet untested South Zone. Jasperoid occurs in zones or lenses up to a few metres wide consisting of massive or "net-textured" silica after limestone, and ranges from pale- to medium-gray and very fine grained to dark-brown and grainy (Figure 9.5). The latter type may also contain vugs with linings of white drusy quartz. In a few drill holes, silica-cemented breccias with silica fragments (after limestone) have been noted. Silicified areas, particularly the brown jasperoids, contain unoxidized pods with very fine-grained disseminated pyrite, and most contain gold.

Dolomitization. Medium-grained, dark-gray, massive dolomite after limestone has been noted along a number of fault zones. Dolomitization obliterates primary textures. Dolomitized rocks along fault zones often exhibit a distinctive "pebbly" texture suggesting brecciation. Dolomite alteration is also manifested in primary (diagenetic) dolomites as areas of light gray, medium gray and coarse white "zebra" dolomite. None of these types of dolomite alteration appears to be spatially related to gold mineralization.

Argillization. Within mineralized areas, mafic sills are "argillized" or clay altered. While sills outside of the mineralized areas are dark green and contain chlorite and muscovite, sills within and immediately adjacent to mineralized areas are bleached and are either white, orange, yellow or red in colour and appear to contain clay minerals. This argillic alteration may be primary and related directly to mineralization, or may be secondary and related to oxidation of pyrite.

The widespread presence of illite was recently confirmed in mineralized silty carbonate rocks and breccia matrix through analysis of core samples using a portable infrared mineral analyzer. The significance and distribution of illite has not yet been quantified.

Figure 9.5 Jasperoid



(Weakly brecciated, dark brown, vuggy jasperoid with hematite and drusy quartz in breccia matrix.)

Limonite. Yellow staining of decalcified or intact silty limestones, bedding planes, tectonic breccias, and (rarely) solution breccias is given the field name "limonite". Yellow, limonitic rocks typically occur in a "halo" over hematite zones, as well as intermixed with hematite. Limonite-only stained rocks rarely contain gold, but are usually anomalous in arsenic, and thus are generally a good indicator of nearby gold mineralization.

Hematite. Bright red-orange staining of decalcified silty limestones (Figure 9.6), bedding planes, tectonic breccias, and solution breccias (particularly matrix material) is interpreted, based on colour, to represent either hematite or goethite or both, and is here referred to as "hematite". Hematite is more strongly developed in the silty, decalcified laminae, and is strongly correlated with gold mineralization.

Hematite may have been derived from several sources, including:

- Oxidized wind-blown silt incorporated in shaly or silty limestones, particularly along bedding planes;
- Oxidized silt originating from the surface and deposited in karst caverns;
- Oxidized silt originating from weathering of silty limestones and ponding in surface karst areas ("*terra rosa*");
- Oxidized silt liberated from limestones through decalcification;
- Weathering of authigenic or hydrothermal pyrite; and
- Primarily hydrothermal processes (thought to be unlikely).

Figure 9.6 Hematite Alteration in basal Pogonip Group

Scorodite. Yellowish-green staining is observed along some fractures and fracture selvages and is sometimes coalesces into pervasive patchy alteration where fracture density is high. High concentrations of arsenic associated with this type of alteration, which overprints hematite alteration (Figure 9.7), suggests that it may be partly composed of scorodite ($FeAsO_4$-$2H_2O$). Scorodite is nearly always present in high-grade gold intervals.

Figure 9.7 Hematite Overprinted by Scorodite

Jarosite. Jarosite [$KFe_3(SO_4)_2$-$(OH)_6$] is massive, yellowish-brown, and is locally present in fractures, fracture selvages, and breccia matrix. The presence of jarosite was confirmed by analysis of core samples with a portable infrared mineral analyzer.

9.2 Veins

Quartz Veins. Quartz veining is relatively common throughout the drill area. Hairline quartz veinlets are ubiquitous in the Notch Peak dolomite, particularly near the margins of boudin blocks, such that they are diagnostic of dolomite in the field. Larger quartz veins (rarely up to one-metre thick) are present in both limestone and dolomite in fold axes, along high-angle faults, and occasionally along dolomite block margins. These quartz veins are generally relatively coarse grained, white, and are barren of sulfides.

Calcite/Aragonite Veins. Coarse calcite veins are relatively common throughout the drill grid. They tend to be small and erratic in orientation and shape. Coarse calcite also commonly cements dissolution breccia zones. Calcite veins are thought to be syn-, late-, and post-mineralization, related to decalcification and/or meteoric processes.

Aragonite veining is common locally, including an area approximately 1.5 kilometres southeast of the drill grid. Aragonite veins are white to pale yellow, comb-like, and range from 1 centimetre to (rarely) 20 centimetres in width. They appear to be relatively late and unrelated to mineralization.

10.0 EXPLORATION

Joint Venture exploration activities at Long Canyon include surface rock-chip sampling of road cuts, grid-based soil sampling, ridge-and-spur soil sampling, prospecting, a gravity survey, an IP/Resistivity survey, detailed mapping, and drilling. Exploration activities prior to the Joint Venture work (prior to May 2006, are described in Section 6.0. Joint Venture drilling is discussed in Section 11.0

10.1 Geologic Mapping

Geological mapping was conducted in 2006 by Coolbaugh (2006), primarily in the drill grid area. Mapping of contacts between the Notch Peak dolomite and overlying and underlying units was carried out using a sub-metre Trimble GPS unit with a base station. Mapping of road cuts in the drill grid area was carried out at a scale of 1 inch = 20 feet (1:240) and included the collection of information regarding bedding orientations, rock type, fracture orientation, and other data.

Geological mapping over a larger area in the central part of the Joint Venture Area of Interest was carried out on a part-time basis over a four-month period from June to September 2008 by Moira Smith. Contacts and structures previously mapped by AuEx were verified, and mapping was extended to other areas of the property. Approximately 1500 structural measurements, including bedding, foliation, joints, lineations, *etc*., were collected. Results of this work are discussed in Section 7.2.

10.2 Surface Sampling

In 2005 through 2006, 580 samples were systematically collected as three-metre chip channels on all road-cut exposures, including both unaltered and altered rock. In 2006, a total of 61 rock grab samples were collected in the course of mapping by Coolbaugh (2006) and analyzed for gold by fire assay and trace elements by ICP. Gold values returned by these samples were generally low, with the exception of samples in and around the existing drill grid. In addition, 507 road-cut channel samples on approximately three-metre intervals were collected in 2006, targeting primarily areas with visible alteration. This sampling clearly outlined surface mineralization in both the West Zone and the southern portion of the Discovery Zone, with samples ranging up to 21 g Au/t and a discrete population of samples >8 g Au/t (Moran, 2008.)

A total of 187 rock grab samples were collected in 2007 during prospecting traverses within the Joint Venture Area of Interest, and 198 road-cut channel samples were taken on approximately three-metre intervals from within the drill grid area. As with sampling in 2006, regional prospecting samples generally returned low values for gold, and road-cut channel sampling returned significant gold in hematite-altered road cuts.

A total of 345 rock chip samples from road cuts were collected in 2008; results are discussed in Fronteer press releases and the Fronteer corporate website (www.fronteergroup.com). The samples have variable lengths, most commonly three metres, and were collected as continuous chips across altered rock units in road-cut embankments. The visual guide to mineralization is oxidation of the rocks, exhibited as hematite staining and coatings on fractures. A total of 49 rock grab samples were collected in 2008, primarily during the course of a ridge-and-spur soil-sampling program.

Two grid-based soil-sampling programs were carried out at Long Canyon in 2008 that extended the existing (2000) soil grid to the north (990 samples) and south (153 samples). Samples were collected from C-horizon soil (there is relatively little development of A and B soil horizons at Long Canyon) and analyzed for gold by fire assay with AA finish and for other elements by ICP. Samples were taken at 61 metre by 61-metre intervals.

The combined 2000 and 2008 soil data show that gold forms a tight cluster in the area where mineralization is exposed on surface, with a few areas of interest to the south and southeast (Figure 10.1). Antimony highlights similar areas. Mercury forms a very tight pattern over exposed areas of the Long Canyon deposit. Arsenic has a distribution similar to antimony, with wide dispersion of low-level arsenic values observed around the deposit. Elevated arsenic is also seen in upper units of the Pogonip Group. Zinc is highest in the northwestern part of the soil grid, in the upper units of the Pogonip Group, and low in the deposit area. Lead shows a similar distribution pattern to zinc. Copper, iron, aluminum, and nickel are elevated immediately southeast of the deposit.

A ridge-and-spur soil sampling and prospecting program was carried out in October 2008. The purpose of the survey was to obtain baseline geochemical data for areas in the southwestern portion of the property that had not been sampled previously, to prospect some areas of interest identified during the 2008 mapping program, and to uncover new areas of alteration or mineralization. A total of 273 C-horizon samples were collected. A broad area of low-level anomalous arsenic is evident in the southwestern part of the project area, but gold is generally absent (Figure 10.1). A total of 30 grab and chip rock samples were collected concurrently with the soil samples in areas with hematite or other alteration; the samples contained only low levels of gold.

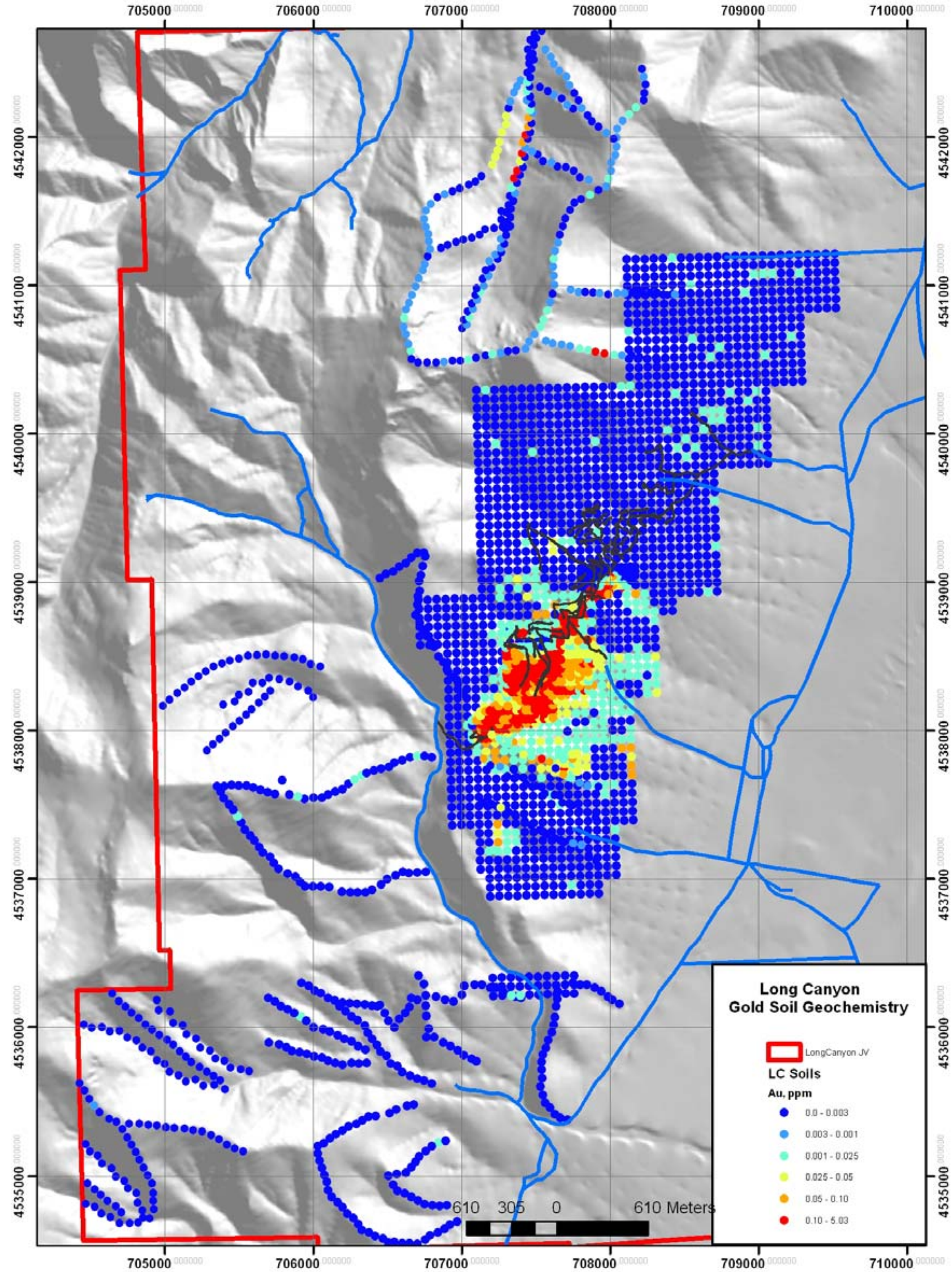
10.3 Geophysics

No geophysical surveys were carried out in either 2006 or 2007. Three ground-based geophysical surveys were completed in 2008, including a gravity survey carried out by Zonge Geophysical ("Zonge") and two IP/Resistivity surveys undertaken by Quantec Geoscience ("Quantec") and Zonge.

Gravity. A ground gravity survey was carried out by Zonge on a 100 metre by 100-metre grid that covered the northern half of the drill grid, as well as areas to the northeast. The reduced-to-pole total Bouguer anomaly map shows a gradient from relatively high gravity in the west to low in the east, consistent with the location of the survey on a mountain front adjacent to a gravel-filled, fault-bounded basin. Two roughly north-trending linear features evident on the horizontal gradient map are interpreted to be range-front faults. A first-vertical-derivative map delineates an additional steep gradient, as well as showing a northwest-trending fabric in the northern project area that may be evidence of northwest-trending faults.

Ground-based gravity surveys, at least on the scale carried out at Long Canyon, can identify large structures, but do not appear to be useful for identifying potential areas of mineralization.

Figure 10.1 Gold-in-Soil Results



<u>*IP/Resistivity*</u>. Two dipole/dipole IP/Resistivity surveys were carried out by Quantec (5 lines) and Zonge (10 lines) over the drill grid and areas to the northeast and southwest. Lines were oriented northwest-southeast and spaced 200 metres apart for the twelve southern lines and 300 metres apart for the three northern lines. The southern lines used an A-spacing of 125 metres in order to collect high-resolution data down to approximately 250 metres. An A-spacing of 150 metres was used on the northern lines to attempt to see deeper into the section. The data were subjected to a 2D inversion and presented on sections, with corresponding pseudo-sections, and plotted as a series of approximate depth maps in plan at 50-metre intervals from 100 to 300 metres.

The resistivity data show an abrupt break in the resistivity from high in the west to low in the east at approximately the same location as the steep gradient modeled in the gravity. This likely corresponds to the abrupt thickening of the basin fill that corresponds to the interpreted Basin and Range fault. Lower resistivity response is also evident along the western edge of the grid, corresponding to middle and upper Pogonip Group strata in the hanging wall of the major low-angle normal fault and stratigraphically above and to the west of the lower Pogonip Group strata in the northern part of the survey area. The most resistive areas correspond to Notch Peak strata exposed on surface; this response is more subdued to the north where the lower Pogonip Group is exposed on surface.

Modeled IP (chargeability) data show a more varied response than the resistivity data, the latter of which can be clearly tied to surface geology. An anomaly was detected in the extreme northwest part of the survey area, corresponding to surface exposures of the upper part of the Pogonip Group. Other anomalous areas were also identified.

Although the source of the IP anomalies is uncertain, there is a good correlation between mineralization and anomalous IP, as evidenced by the distribution of anomalies relative to drill-tested areas.

11.0 DRILLING

11.1 Summary

The Mineral Resources discussed in this report were estimated using the data provided by core and reverse-circulation drilling completed by Pittston, AuEx, and the Fronteer-AuEx Joint Venture through 2008. Joint Venture drilling in 2009 initiated subsequent to the completion of the resource estimation and is continuing as of the Effective Date of this report.

Drilling at Long Canyon has been successful in defining potentially economic gold mineralization in numerous drill holes that have delineated four sub-parallel zones along a strike extent of approximately 1700 metres. The limits of the gold mineralization are not fully outlined and remain open along strike and at depth within the presently defined zones; there is also excellent potential for the discovery of new zones of mineralization.

A total of 231 drill holes were completed through 2008 and used in the Long Canyon resource estimation (Table 11.1); 164 of these holes were completed in 2008. Down-hole drill depths range from 30 to 300 metres, with an average depth of 147 metres. This drilling was completed on a nominal 50-metre-spaced grid, with the drill sections oriented northwest-southeast.

Table 11.1 Long Canyon Mineral Resource Database Summary

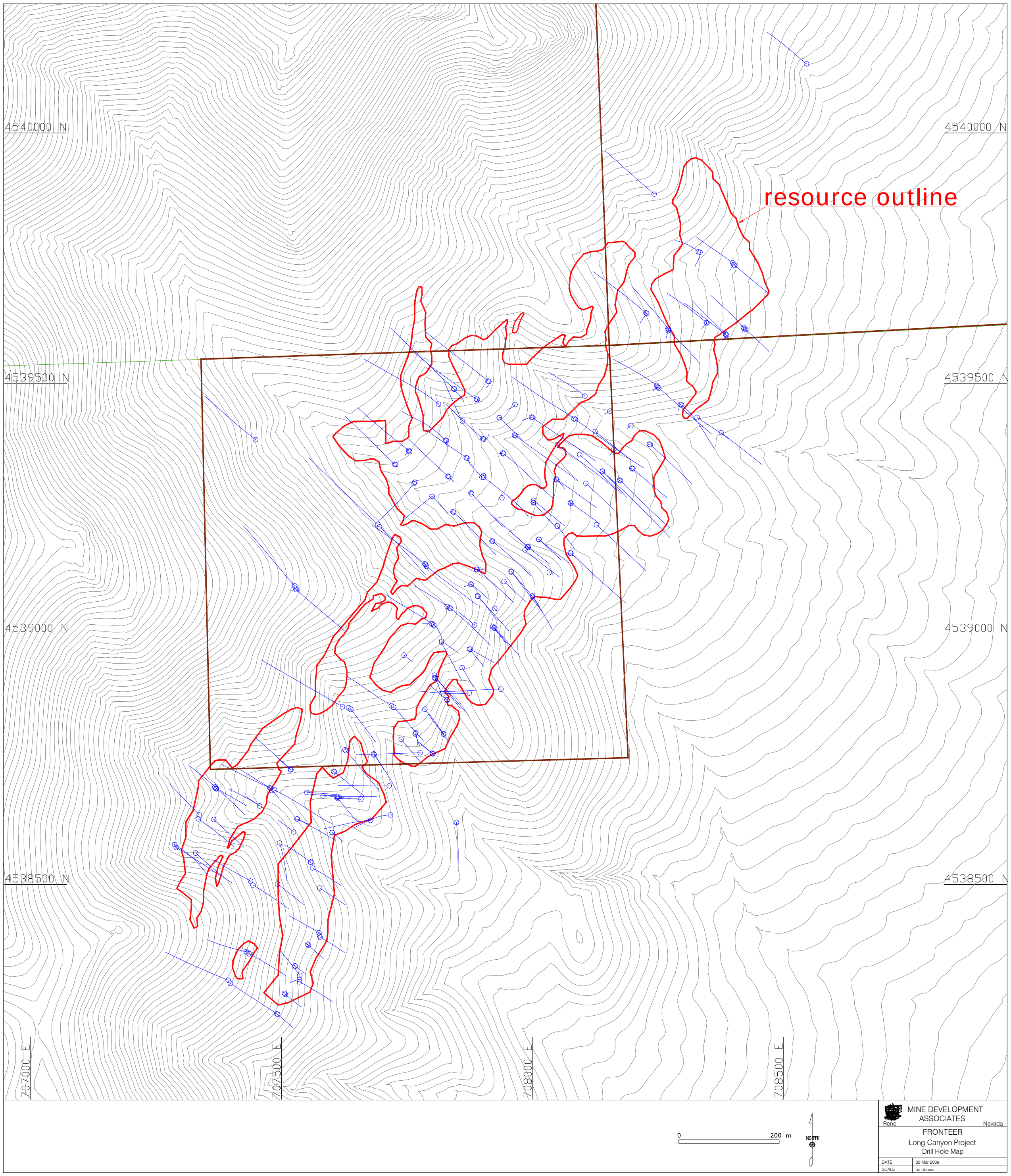
Company	Period	Hole Numbers	Core		RC		Total	
			No.	Metres	No.	Metres	No.	Metres
Pittston	2000	LC001 – LC007	-	-	7	1,147.57	7	1,147.57
AuEx	2005	LC008 – LC014	-	-	7	768.10	7	768.10
Fronteer-AuEx JV[1]	2006-2008	LC015 – LC229C LCMW3 & LCMW4	61	7,319.33	156	24,612.6	217	31,931.93
Totals			*61*	7,319.33	*170*	*26,528.27*	*231*	*33,847.60*

1. AuEx operated the Joint Venture drilling of LC015 to LC030, while Fronteer was the operator for all subsequent drilling.

The four mineralized zones at Long Canyon coalesce in various locations to form a continuous body of mineralization that plunges about ten degrees to the northeast. The mineralization has an apparent dip of five to ten degrees to the southeast in sections cut across the plunge direction, reflecting the control exerted by the upper and lower contacts of the dolomite boudin blocks. Internal to these deposit-scale geometries, boudin noses form subvertical controls to the mineralization that dip to the northwest or southeast depending on the boudin-termination facing orientation.

Drill-hole orientations vary somewhat at Long Canyon (Figure 11.1), due to both the early-stage nature of some of the holes, which were drilled before the geometry of the mineralization was understood, and the varying orientations of the controls to the mineralization. There are a relatively small number of holes that are therefore poorly oriented with respect to the mineralization encountered, which leads to exaggerated lengths of the down-hole intercepts. This is mitigated by the resource modeling techniques employed, which constrain all intercepts to lie within explicitly interpreted domains that appropriately respect the geologic controls.

Figure 11.1 Location Map of Drill Holes Utilized in Resource Estimation



11.2 Pittston 2000 Drilling

Eklund Drilling Company, Inc. of Elko, Nevada ("Eklund"; recently acquired by Boart Longyear Drilling of Elko, Nevada) was the drill contractor and used a Drill Systems MPD 1500 track rig for the seven Pittston RC holes. The drill logs indicate that the hole diametres were 5 inches (13cm).

11.3 AuEx 2005 Drilling

The RC drilling contractor used by AuEx in 2005 was Layne-Christensen Company ("Layne-Christensen"), who drilled 5 ¼-inch (13.3 centimetres) diametre holes using a Foremost Prospector W-750 buggy rig. Stratex six-inch (15 centimetres) surface casing was used for all of the holes to depths ranging from three to six metres.

11.4 Fronteer-AuEx Joint Venture 2006-2009 Drilling

The RC drilling contractor used by Fronteer in 2006 and 2007 was Layne-Christensen, while Eklund drilled the 2008 RC holes. Small samples of the RC cuttings from each sample interval were washed and put into numbered chip trays for logging. the RC chips were logged on-site into a custom-designed Excel spreadsheet for the project. Logging was aided by use of a binocular microscope. Data recorded included dominant lithologies, colour, alteration characterization, dominant structural evidence (brecciated, fault gouge), veining type, and density.

The core-drilling contractor for the six core holes drilled in 2007 was DOSECC Inc of Salt Lake City, Utah. The 2008 core holes were drilled by Major Drilling America, Inc. of Salt Lake City, Utah and Elko, Nevada. All Long Canyon core holes were drilled with HQ-sized core (6.4-centimetre diametre). The core was logged directly into digital files by Fronteer geologists. The digital logs included fields for rock type, colour, alteration, mineralization, and structural data, with a separate log for breccia descriptions. Rock Quality Designation ("RQD") was also captured in the logs. The logs capture data largely in numerical or letter code format. Completed logs were imported into an Access database.

The 2009 drilling program commenced on April 28, utilizing one diamond-core drill and one RC rig; two additional core drills were added in mid-May. The RC drill was in use through the end of May, and the program has continued since then with three core drills. The core contractor is Major Drilling, based in Salt Lake City, Utah, and the RC contractor is Boart Longyear Drilling, based in Elko Nevada.

Most of the 2009 drill holes completed as of the Effective Date of this report have focused on: (1) infill drilling of the western half of the resource area; (2) limited geotechnical drilling along the west side of the deposit; and (3) drilling of large diameter (PQ) core on three widely-spaced lines in order to obtain material for metallurgical testing (Table 11.2). The remainder of the holes have tested for extensions of the deposit along the southeast, south, and west sides of the deposit. It is anticipated that the emphasis will soon shift from infill and step-out drilling in the shallower, western part of the deposit to exploratory drilling along the postulated deeper extensions of the deposit to the northeast, when permit conditions that presently limit drilling depths are satisfied (see Section 4.5).

Table 11.2 2009 Long Canyon Drilling Program Summary

Purpose	Core		RC		Total	
	No.	Metres	No.	Metres	No.	Metres
Exploration - HQ	85	11,007	19	2,205	85	13,212
Monitoring Wells			2	400	2	400
Metallurgical Holes - PQ	17	1,437			17	1,437
Metallurgical Holes - HQ	3	305			3	305
Geotechnical Holes – HQ	4	676			4	676
Totals	*109*	13,425	*21*	*2,605*	*130*	*16,030*

Core is examined and logged on site into a digital logging sheet, with lithology, alteration, mineralization, and structural characteristics recorded. The core is photographed both wet and dry for archival and geotechnical purposes. Approximately three samples per drill hole are collected for specific-gravity determinations; a range of rock types and both mineralized and unmineralized rock are selected for these measurements.

Available results for the 2009 drilling can be found in press releases available at the Fronteer website (http://www.fronteergroup.com/).

11.5 Drill-Hole Collar Surveys

The drill-hole collars have been surveyed at different times by different contractors. In an effort to standardize the survey data, the collars from all holes that could be identified in the field were surveyed at the end of the 2008 drilling program by All Points North Surveying and Mapping of Elko, Nevada ("All Points North"). Although the collars are marked in the field after completion with a cement plug, wire, and metal tag, subsequent traffic on the drill pads destroyed the evidence of the collars in some cases.

The 2008 survey program was completed using a geodetic survey-grade Trimble 4000-series GPS receiver with a base station for real-time correction. Accuracy of the measurements is ±2 centimetres in the X and Y directions and ±3 centimetres in the Z direction.

A total of 34 holes in the sequence LC001 through LC067C could not be located and surveyed by All Points North. The older survey data therefore remains in the project database, including 27 holes surveyed by M Coolbaugh (AuEx project geologist) in September 2007 using a Trimble backpack GPS unit with sub-metre accuracy (although drill collars for LC007, 010, 011, 013, 014, and 027 through 030 could not be found and therefore were approximately located), five holes (LC031 through 036) surveyed by Carlin Trend Surveying of Elko, Nevada using a Trimble GPS with differential correction (sub-metre accuracy), and two holes (LC063C and 067C) surveyed by project geologists using a standard handheld GPS receiver (±15 metres accuracy). All stated accuracies assume proper techniques employed in open areas with uninhibited access to satellites; accuracies were obtained from www.kowoma.de/en/gps/accuracy.htm. Accuracies in the z direction may be greater than stated.

11.6 Down-Hole Surveys

All Pittston and Fronteer holes, except LC032, 049, 052, 057, 062C, 066C, 085, 126, and 169C, have down-hole survey information in the database. Down-hole surveys for the holes drilled by Pittston (LC001 through LC007) were completed by Silver State Surveys, Inc.; the survey equipment used is not known. Fronteer holes were surveyed using a Surface Reading Gyroscope by International Directional Services of Elko, Nevada. No down-hole surveys were conducted on the AuEx holes (LC008 through LC014), although averaged deviations were added to the database.

12.0 SAMPLING METHOD AND APPROACH

The Long Canyon database includes assay data from both RC and core drill holes. MDA believes that the RC and core sampling procedures provided samples that are sufficiently representative and of sufficient quality for use in the Mineral Resource estimation discussed in Section 17.0. While RC down-hole contamination does present a sample integrity issue in some holes, MDA believes techniques employed during resource modeling have adequately addressed the problem, as discussed below.

12.1 Surface Sampling Methods

Rock chip sampling was conducted as random chip sampling, random grab sampling of selective rock outcroppings, and continuous chip samples along the outcrop or road-cut exposures. Various sample intervals were used, although three-metre samples were standard for road cut chip sampling.

12.2 Drill Sampling Methods

Pittston. The following description of the Pittston RC sampling procedures is taken from the Long Canyon technical report prepared for AuEx (Moran, 2008).

The former Pittston drill project coordinator, RC drill samples were collected at 5 foot (1.524 metres) intervals by Pittston staff as splits from a rotary wet splitter attached to the cyclone sample-collector discharge. Secondary splits of the RC samples were not collected.

AuEx. AuEx used sample collection procedures similar to those described above for Pittston (pers. comm., Eric Struhsacker, US Exploration Manager for AuEx, 2009).

Fronteer. The Fronteer RC drilling was completed with the injection of water to reduce dust at the drill site for health reasons. Samples of RC cuttings were collected every 1.524 metres after passing through a rotary wet splitter. The split samples weighed approximately 4.5 to 9 kilograms.

After logging of the drill core at the Fronteer field office at the Big Spring Ranch, the drill core was marked for cutting, photographed, and transported by Fronteer personnel to Elko. Visibly altered rock is sampled on nominal 1.52-metre intervals, unless geological contacts dictate otherwise; sampled intervals through 2008 vary from 0.15 to 3.048 metres and average 1.40 metres. The marked core was cut into halves with a diamond saw by American Assay Laboratories through to mid-2008, after which a core cutting facility at the Fronteer field office in Elko was put into service. Half-core samples were sent for assaying, with the remaining half stored in the Fronteer Elko warehouse.

Long Canyon core holes have average core recovery and rock quality designation ("RQD") values of 97% and 43%, respectively. Including only those intervals coded to the mineral domains used in the resource estimation (Section 17.0), these averages change to 98% and 47%, respectively.

Gold grades composited over the core recovery and RQD intervals are compared to the geotechnical data within the modeled mineral domains in Figure 12.1 and Figure 12.2, respectively.

Figure 12.1 Core Recovery *vs.* Gold Grade

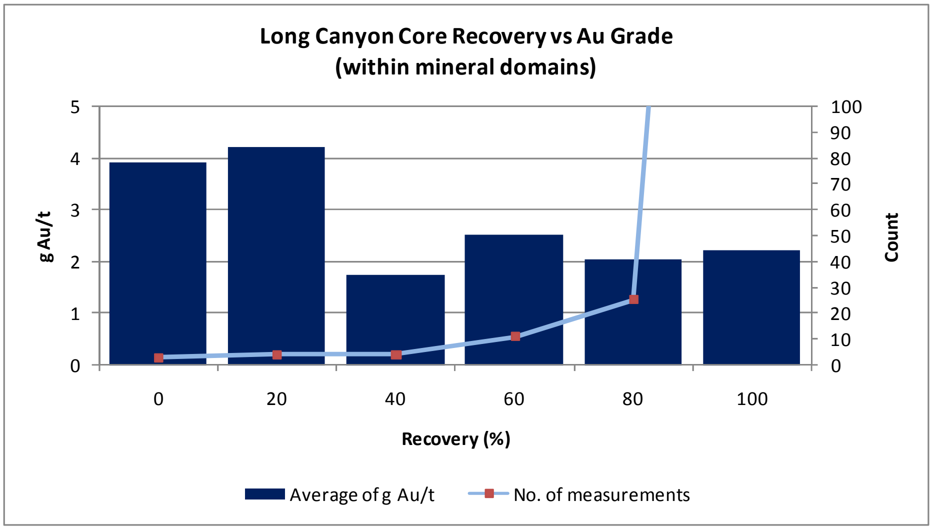
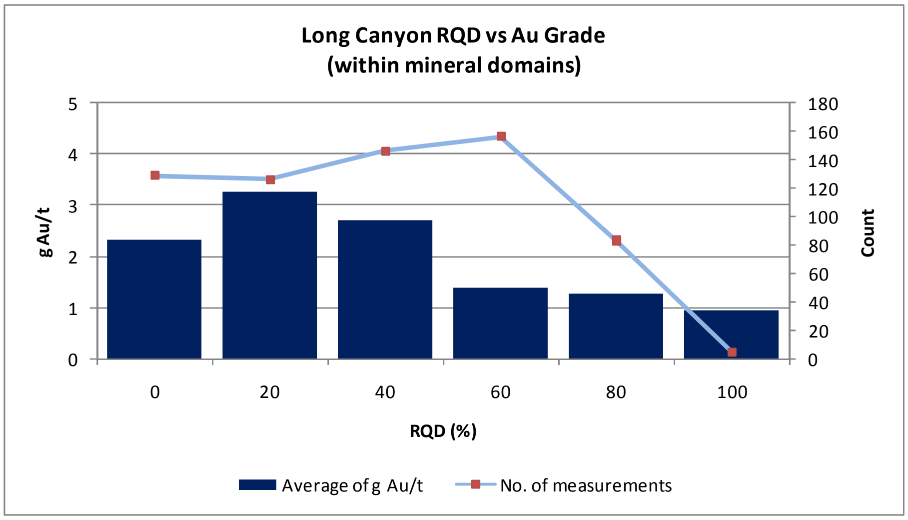


Figure 12.2 RQD *vs.* Gold Grade



It is difficult to conclude there is any correlation between core recovery and gold grade, as too few of the 645 drill intervals within the mineral domains have recoveries lower than the 80 to 100% bin. There is a strong relationship between higher gold grades and lower RQD values, however (Figure 12.2). This negative correlation between gold and RQD is not surprising, as higher gold values at Long Canyon often occur within solution collapse breccias, which tend to be more broken than relatively weakly mineralized limy units.

12.3 Reverse-Circulation Sample Contamination

Due to the nature of RC drilling, the possibility of contamination of drill cuttings from intervals higher in the hole is a concern, especially when groundwater is encountered or fluids are added during drilling. Only one hole intersected groundwater at Long Canyon, but water was injected during the drilling of all of the Fronteer RC holes and at least some of the AuEx and Pittston holes.

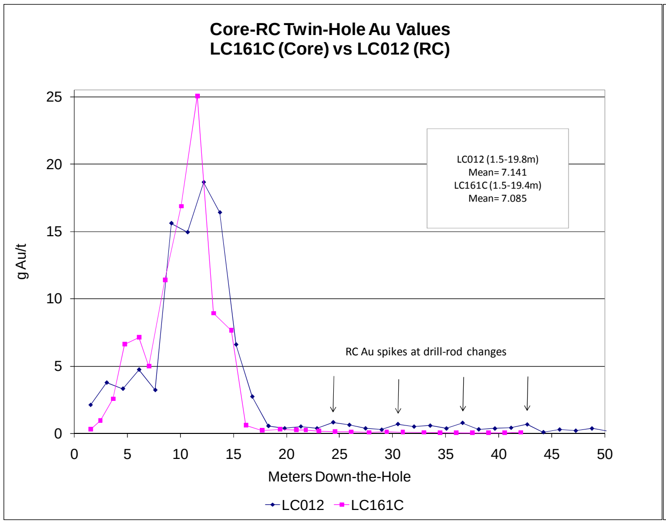
Down-hole contamination can sometimes be detected by careful inspection of the RC drill results in the context of the geology, by comparison with adjacent core holes, and by examining down-hole grade patterns.

A number of the Long Canyon RC holes clearly exhibit cyclic down-hole patterns in the gold assays. These are detected by examining the gold results of each set of four samples derived by the drilling of the same 20-foot (6.1 metres) drill rod. In a classic case, the first sample of the drill rod will have the highest grade, while the following three samples will gradually decrease in grade. This classic ‘decay’ pattern in grade is caused by the accumulation of mineralized material (present at some level higher in the hole) at the bottom of the hole as the drilling pauses and a new drill rod is added to the drill string. When drilling resumes, the first sample has the greatest amount of contamination, and the successive samples are gradually ‘cleaner’ as the accumulated contamination is removed and the continuing contamination experienced during the drilling is overwhelmed by the material being drilled. This decay pattern is usually possible to detect only while drilling barren or very weakly mineralized rock. Even in cases where this cyclic gold contamination is of such low grade as to have minimal impact on resource estimation, its presence suggests that similar, and possibly more serious, contamination is occurring higher in the hole within mineralization, where the contamination is impossible to recognize.

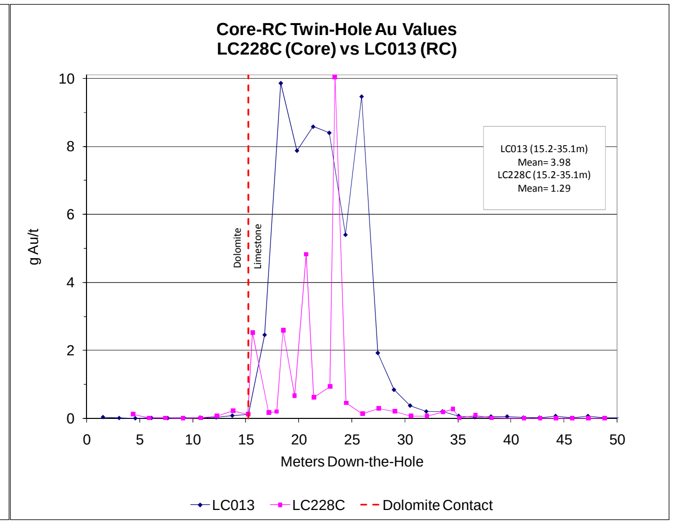
The geologic context can also be used to detect contamination. The dolomite boudins themselves are only locally mineralized, with mineralization usually restricted to brecciation in and around the boudin noses. Highly mineralized intersections within the dolomite boudins that lie immediately down-hole of strong mineralization in the limestones in contact with the boudins must therefore be considered as possible candidates for contamination.

There are six sets of RC-core twin holes at Long Canyon, which are compared in Figure 12.3. These graphs show the down-hole gold plots for each hole in the twin set, as well as the dolomite/limestone contact, where applicable, and mean-grade comparisons of pertinent intervals. The collar elevations of some of the twin sets were adjusted so that both holes intersected the dolomite contact at the same down-hole depth in order for the graphical comparisons to match more closely.

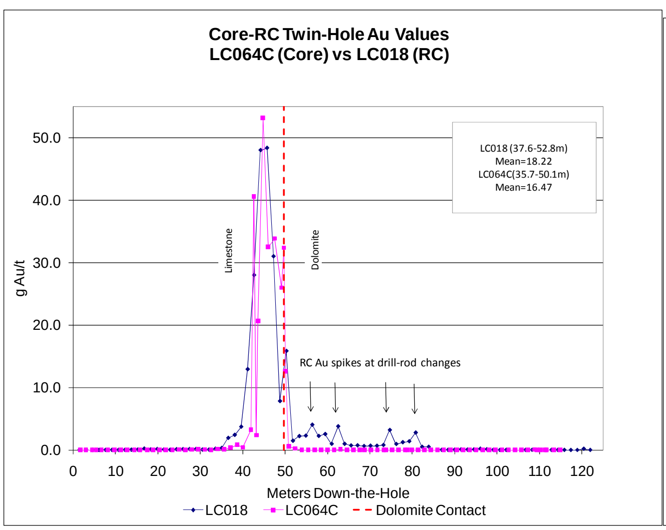
Figure 12.3 RC-Core Twin-Hole Comparisons



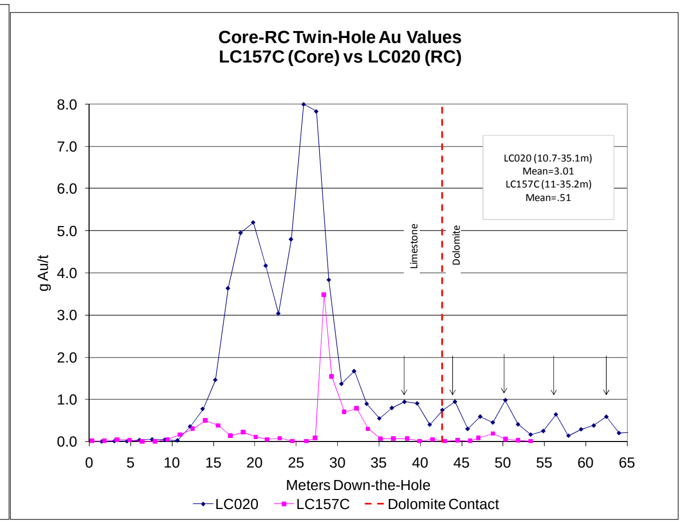
(a)



(b)

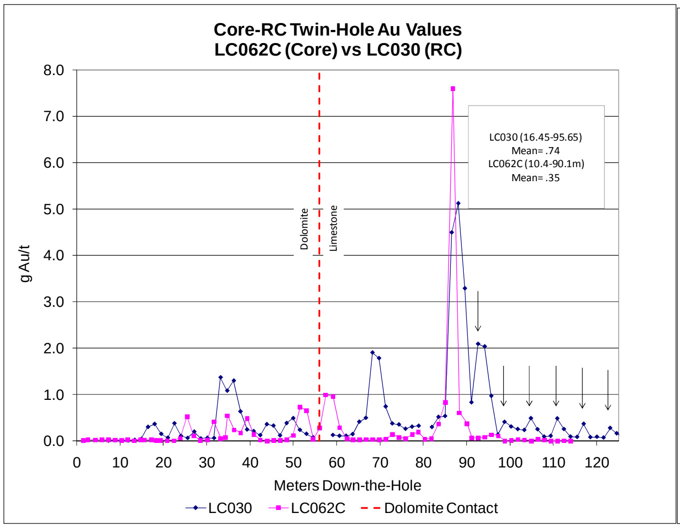


(c)

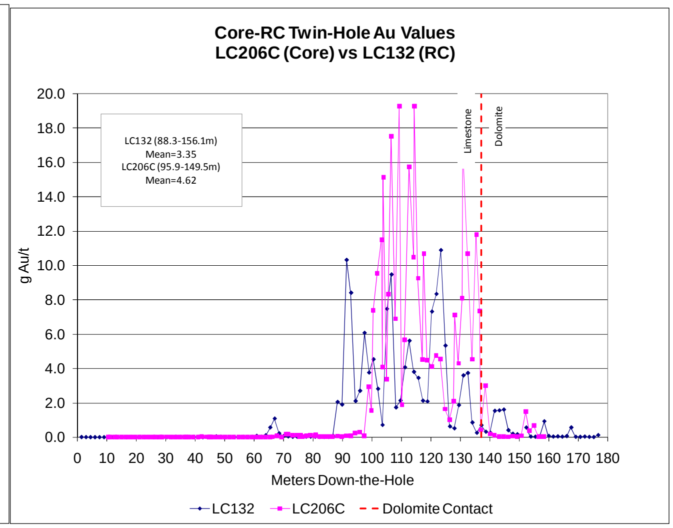


(d)

Figure 12.3 RC-Core Twin-Hole Comparisons, cont.



(e)



(f)

Four out of the six twin sets have clear down-hole cyclic patterns in gold values in the RC holes that correlate with rod changes (as shown by arrows on the graphs), without corresponding patterns in the core holes. In every case, these patterns initiate immediately down-hole of significant gold mineralization, which is the obvious candidate as the source of the contamination. The cyclic patterns in three of the RC holes occur within the dolomite boudins. The suspect gold values within the cyclic patterns spike above the resource cutoff of 0.3 g Au/t in all cases, with the values in LC018 spiking to 4 g Au/t.

Two twin sets have significant grade variations between the RC and core holes: LC013 - LC228C and LC020 – LC157C. The angles of the holes in the former pair differ by 10˚, and the latter pair intersects the mineralized limestone/dolomite contact at very shallow angles, which in both cases could have led to the sampling of differing geology. Excluding these pairs, as well as the intervals exhibiting the cyclic patterns in the remaining twin pairs, the mean gold grade of the RC holes compares well with the mean of the core holes for the selected intervals selected (Table 12.1).

The twin-hole data, in addition to careful inspection of all of the RC gold data, have clearly identified down-hole contamination of gold in a portion of the Long Canyon RC drill samples that is material to resource estimation. In recognition of this, the mineral domain modeling used in the resource estimation described in Section 17.0 has excluded the mineralized samples suspected of being contaminated. It should be noted that the identification of suspect assays is interpretational; MDA believes it is possible that some excluded mineralization is 'real', and is sure that some mineralized samples included in the resource estimation are affected by contamination.

Table 12.1 Statistical Comparison of RC-Core Twin Holes

CORE - RC TWIN HOLES							
Twin Sets	**Type**	**Collar Separation (m)**	**From (m)**	**To (m)**	**Interval (m)**	**g Au/t**	**Difference**
LC062C	Core	4.00	10.40	90.10	79.70	0.35	111.4%
LC030	RC		10.70	89.90	79.20	0.74	
LC064C	Core	3.60	35.70	50.10	14.40	16.47	10.6%
LC018	RC		35.10	50.30	15.20	18.22	
LC161C	Core	2.70	1.50	19.40	17.90	7.085	0.8%
LC012	RC		1.50	19.80	18.30	7.140	
LC206C	Core	2.00	89.00	149.70	60.70	4.620	-27.5%
LC132	RC		88.30	149.30	61.00	3.350	
All	*Core*				*172.70*	*3.893*	*-0.8%*
All	*RC*				*173.70*	*3.860*	

13.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY

The analytical laboratories used by Pittston, AuEx, and Fronteer (American Assay Laboratories and ALS Chemex), as well as the analytical procedures used by the laboratories to obtain the gold assays for Long Canyon, are well recognized and widely used in the minerals industry.

13.1 Sample security

The Pittston RC samples were transported by Pittston personnel to a staging area at the project site. AuEx and the Fronteer-AuEx Joint Venture left their RC drill samples at the drill-site locations. In all cases up to November 2008, American Assay Laboratories of Sparks, Nevada ("AAL") picked up the drill samples and transported them to their sample preparation facility in Elko, Nevada. Joint Venture RC samples generated after 2008 were picked up by either AAL or ALS Chemex of Reno, Nevada ("Chemex"). Some of the coarse rejects from the Pittston drill samples were retained by Pittston and are now in the possession of Fronteer.

Joint Venture HQ core samples were collected at the drill site by Fronteer personnel and transported to a secure trailer at Big Spring Ranch, where the core was logged, marked for sampling, and photographed. The core was then transported by Fronteer to the AAL preparation facility in Elko for sawing, sampling, and sample preparation until mid-2008. Core boxes with the remaining half core were transported by Fronteer from the AAL facility to Fronteer's secure warehouse in Elko. In the latter half of 2008, Fronteer brought the core from the on-site trailer to their secure office in Elko, where the core was cut and sampled before transport by Fronteer personnel to the Elko sample preparation facilities of either AAL or Chemex. The remaining half core is retained by Fronteer in Elko.

Following preparation of the drill samples in the Elko labs, AAL and Chemex shipped the sample splits to their facilities in Sparks and Reno, respectively, for assaying.

Joint Venture coarse rejects from drill samples analyzed by AAL or Chemex currently reside at Fronteer's Elko warehouse. Pulps generated prior to hole LC-068 are stored at Fronteer's warehouses in Reno or Elko, Nevada, while pulps generated subsequent to LC-068 are stored at Fronteer's Elko warehouse.

13.2 Sample Preparation and Analysis

Until November 2008, all samples generated from surface sampling and drilling programs at Long Canyon were prepared and analyzed by AAL. Beginning in November 2008, core samples and some RC samples were sent to Chemex for sample preparation and analysis due to a significant backlog at AAL's Elko sample preparation laboratory. Holes assayed in part by both Chemex and AAL include LC139C, 142C, 143C, 146C, 148C, 155C, 157C, 160C, 161C, and 164C. Holes assayed entirely by Chemex include LC180C, 182C, 187C, 190C, 192C, 195C, 196C, 201C, 202C, 203C, 206C, 208C, 223, 224, 225, 226, 227, 228C, 229C, MW3, and MW4. All 2009 drill samples have been analyzed by Chemex.

All samples submitted for assaying were analyzed for gold and the majority of holes have samples with multi-element ICP analyses (30, 69, or 72 elements). AAL and Chemex employed standard sample preparation procedures that included crushing the entire sample to 8 to 10 mesh and splitting the material to 1/8 to 1/16 volume in a riffle splitter. The splits were pulverized to nominal 150 mesh. The standard gold assay for the Long Canyon drill samples used a 30-gram charge fire assay with an atomic absorption spectroscopy ("AAS") finish. AAL and Chemex standard assays that returned values of 10 g Au/t or higher were re-analyzed by fire assay with a gravimetric finish on all samples.

AAL and Chemex also completed cyanide-soluble analyses on most samples with reported values of about 0.3 g Au/t or higher. AAL placed 30.0 ± 0.1 grams of sample pulp into a 150-millilitre bottle with 60.0 ± 0.1 millilitres of 0.30% NaCN. The bottles were tumbled end over end for 60 minutes at room temperature. After allowing it to settle for two hours, the solution was analyzed for gold by AAS with a background correction. Chemex used their "Au-AA13" analytical method. A nominal 30 grams of sample pulp was continually rolled and leached for one hour at room temperature in a 60-millilitres solution of 0.25% NaCN, maintained at a pH of 11 to 12. Gold was analyzed by AAS.

Select pulps from 25 sample intervals from the 2008 drilling were analyzed by AAL by standard fire-assay methods on +150 mesh and -150 mesh screen-size fractions (known as "metallic sieve" or "screen-fire" analyses).

All data from logging and assaying is verified on site and uploaded to a database maintained at the Fronteer Reno server. The data are then imported into GEMS® for generation of sections and three-dimensional modeling.

14.0 DATA VERIFICATION

14.1 Fronteer-AuEx Joint Venture Quality Assurance/Quality Control Results

The Joint Venture Quality Assurance/Quality Control ("QA/QC") program included analyses of standard reference materials ("standards"), blanks, field duplicates, and duplicate pulps, as well as check assays by umpire laboratories. The program was designed to ensure that at least one standard, blank, *or* field duplicate was inserted into the drill-sample stream for every 44 drill samples, which are the number of Joint Venture samples in each AAL analytical batch. In practice, the insertion rates for the QA/QC samples were somewhat higher.

Certified Standards. Standards are used to evaluate the analytical accuracy and precision of the assay laboratory during the time the drill samples were analyzed.

Fronteer acquired four certified reference standards from Rocklabs of Aukland, New Zealand, and one from Minerals Exploration and Environmental Geochemistry of Reno, Nevada ("MEG") for use in their 2006-2008 Long Canyon drilling programs (Table 14.1). These standards have a range of certified gold values that is representative of the deposit. Five standards were prepared by MEG from both high and low-grade mineralized material from the Long Canyon deposit for use in the 2009 drilling program (results not discussed herein). In addition, three standards created by Pittston were also used early in the project (Table 14.2). Pittston contracted AAL to prepare standards from RC rejects from holes drilled at a project on the western side of the Pequop range. These standards did not undergo round-robin testing by multiple laboratories, and the accepted values are not certified.

The standards were assigned sample numbers in-sequence with their accompanying drill samples and were inserted into the drill-sample stream of most holes from LC042 through to the last hole drilled as of the date of this report, LC229C. MDA compiled 585 analyses of these standards, which were inserted into the sample sequence of all except four of the holes drilled by the Joint Venture, which equates to an insertion rate of one standard for every 35 drill samples (there are a total of 20,624 drill-sample assays for these holes in the resource database). Most of the analyses were completed by AAL, although Chemex analyzed drill samples and the accompanying QA/QC samples from some of the later holes.

Table 14.1 Certified Standards – Joint Venture Program

Standard	Standard Source	Certified Value (g Au/t)	Standard Deviation
OxE56	Rocklabs	0.611	0.015
OxJ64	Rocklabs	2.366	0.079
OxN62	Rocklabs	7.706	0.117
OxP61	Rocklabs	14.92	0.35
SRM 0.55	MEG	0.524	0.026

Table 14.2 Uncertified Standards – Joint Venture Program

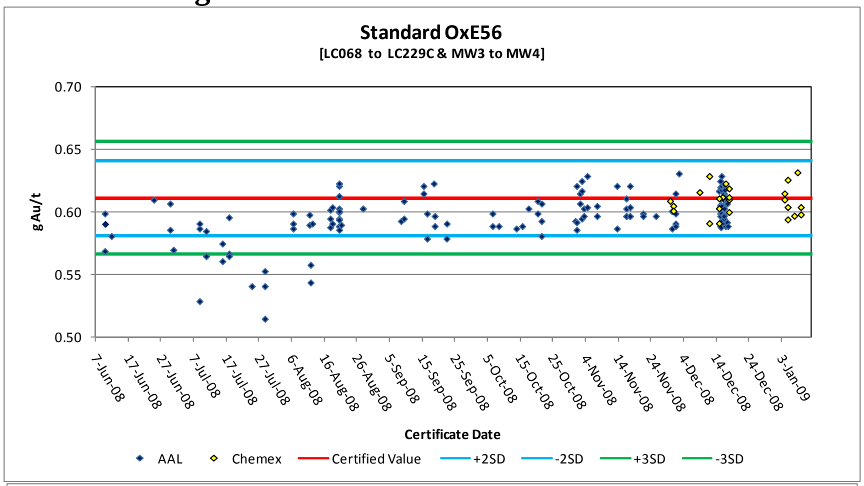
Standard	Standard Source	Accepted Value (g Au/t)	Standard Deviation
PQ-2	Pittston	3.07	0.16
PQ-4	Pittston	3.64	0.43
PQ-10	Pittston	10.1	0.96

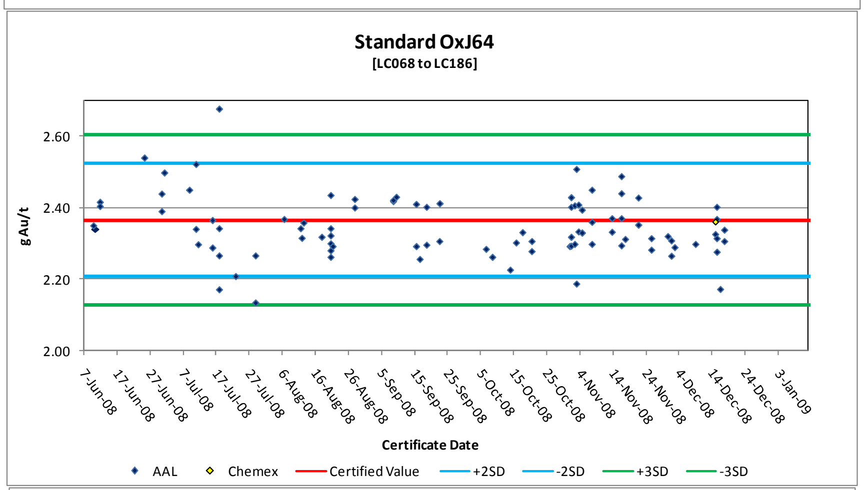
The following discussion of the standard results includes graphical representations of the data. These graphs show the dates of the assay certificates ordered along the x-axis, the gold grade of the standard assays on the y-axis, the certified or accepted values of the standards as red lines, and ± two and ± three standard-deviation limits of the standards as blue and green lines, respectively. AAL analyses are shown as blue dots, while Chemex analyses are yellow dots.

In the case of normally distributed data (note that most assay datasets from metal deposits are positively skewed), 95% of the standard analyses should lie within the two standard deviation limits of the certified/accepted value, while only 0.3% of the analyses should lie outside of the three standard deviation limits. As it is statistically unlikely that two consecutive samples would lie outside of the two standard deviation limits, such samples are considered failures unless further investigation proves otherwise. All samples outside of the three standard deviation limits are considered to be failures. Failures should trigger laboratory notification of potential problems and a re-run of all samples included with the failed standard result.

The 448 assays from the Rocklabs standards are presented in Figure 14.1. These standards were submitted with samples from all holes in the sequence LC068 through LC229C, as well as LCMW3 and LCMW4.

Figure 14.1 Rocklabs Standard Results





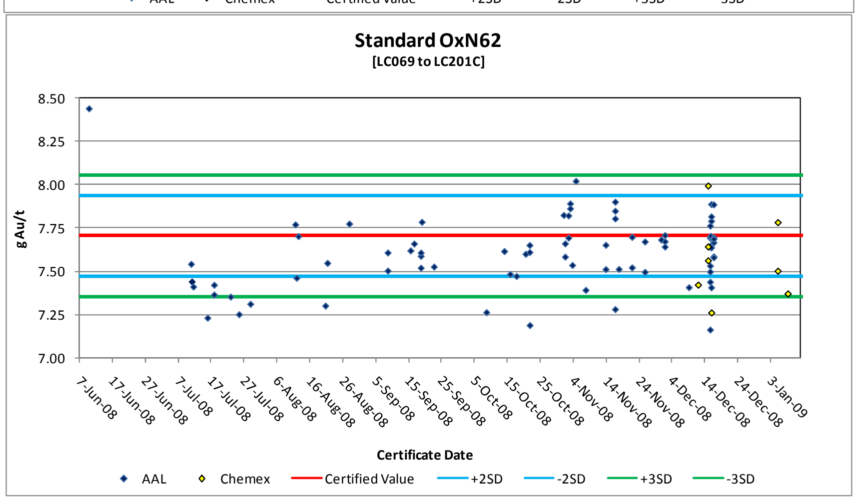
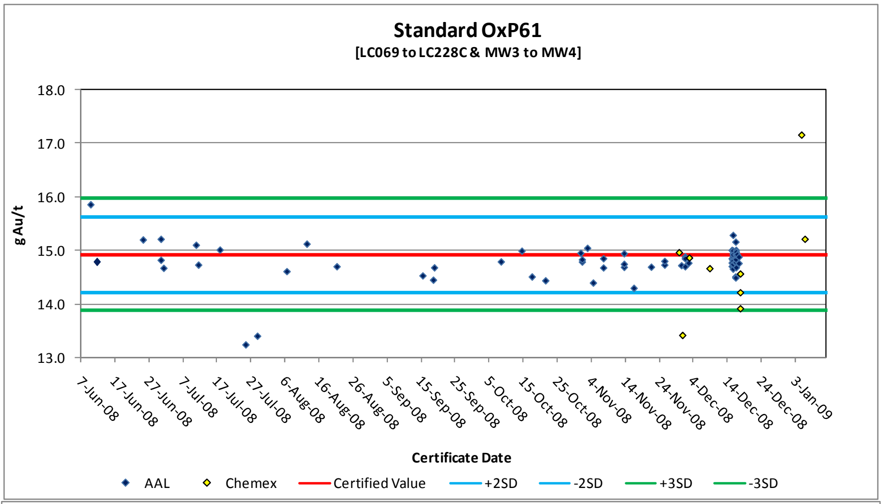
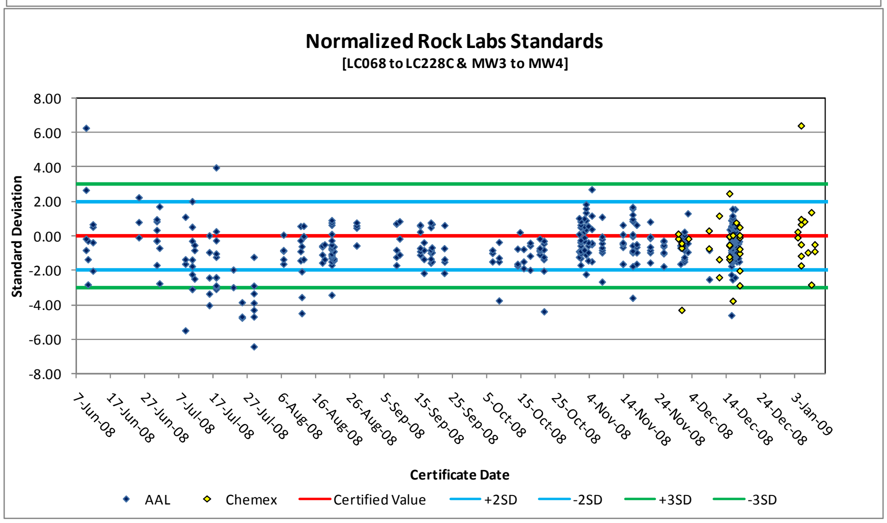


Figure 14.1Rocklabs Standard Results, cont.





The AAL results for standard OxE56 have a clear low bias with respect to the certified value from the initiation of its use through to October 2008, while a slight low bias is evident after October 2008. The overall mean of the AAL analyses is 2.5% lower than the certified value. Twelve results lie outside of the three standard deviation limits, although four lie just outside of the three standard-deviation limits; all of these failures occurred in the period of July through August 2008. All of the jobs including these failures were rerun. The mean of the Chemex analyses of the OxE56 standard is 0.5% lower than the certified value, with no failures.

Although the mean of the AAL analyses of standard OxJ64 is only 0.9% lower than the certified value, a pattern can be discerned in the plot (Figure 14.1), whereby the data points define a serpentine relationship with respect to the certified value. Although the certified values of OxE56 and OxJ64 are quite different, the variations between the AAL analyses and the certified values over time are very similar. One AAL analysis of OxJ64 is a failure, and the job was rerun. One Chemex sample (7.49 g Au/t) is removed from the graph due to a presumed misidentification problem (likely OxN62). The single remaining Chemex analysis of this standard is almost identical to the certified value.

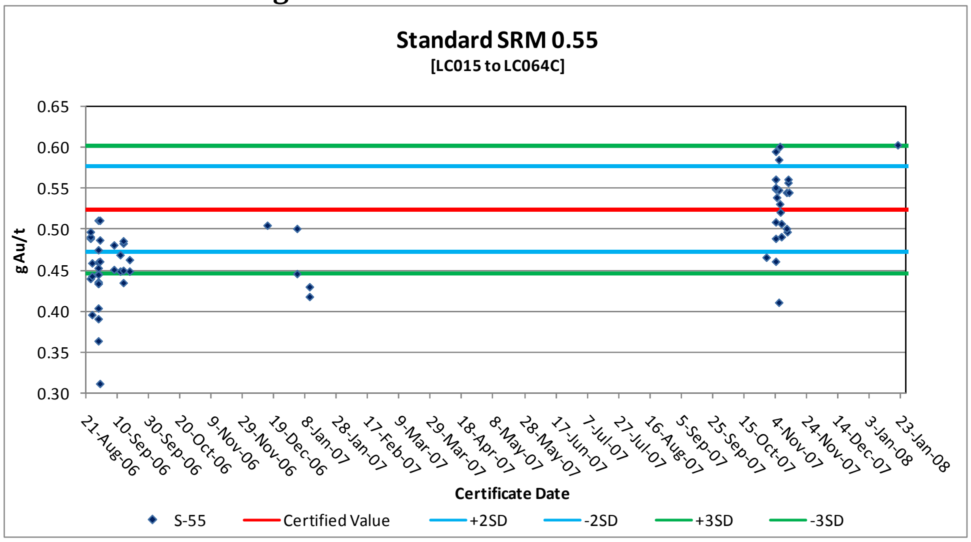
There are ten AAL failures for standard OxN62. Six of the failed assay jobs were rerun; the job for one of the other failures was not rerun due to low grades in the drill samples. The mean of the AAL analyses is 1.3% lower than the certified value. There are only eight Chemex analyses of the standard, one of which was a failure (the job was not rerun).

The AAL analyses of standard OxP61 average 1% lower than the certified value. The nine Chemex analyses also average about 1% lower than the certified value. There are two failures each for the Chemex and AAL standards; two of the jobs that include the failures were rerun.

In order to examine all of the data simultaneously, the AAL and Chemex analyses were normalized based on their position relative to the certified values, expressed in standard deviation units (see final graph of Figure 14.1). The standard analyses have a suggestion of a serpentine pattern, which evidences some analytical drift in the AAL analyses over the time period of the Joint Venture analyses. The 405 AAL analyses of the standards exhibit a slight low bias overall; the standard assays average 0.7 standard deviation units below the normalized certified value. The analyses were particularly low, with many failures, mid-July to the end of the month (six holes within the sequence of LC071 through LC094). The 42 Chemex analyses (excluding the one analysis that was likely mislabeled) average 0.4 standard deviations below the normalized certified value.

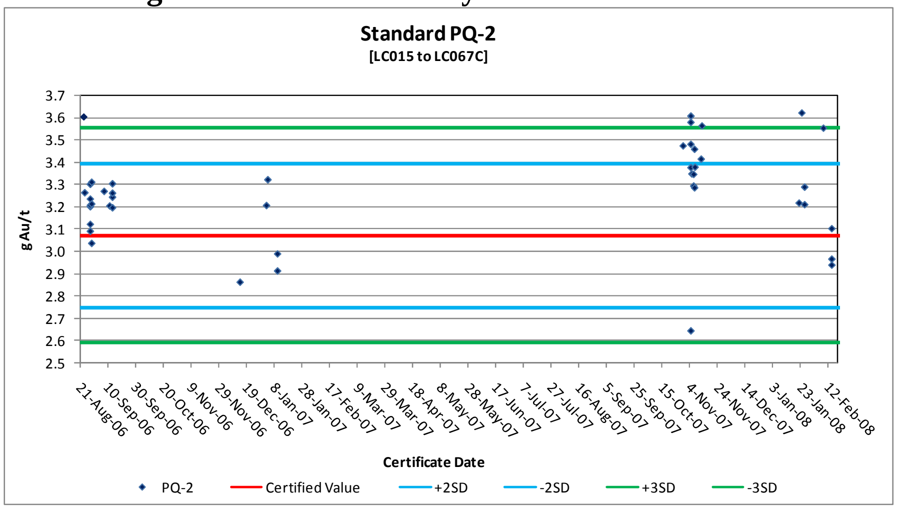
There are 64 analyses of the MEG standard, which was inserted with the drill samples from 40 holes within the sequence LC015 through LC064C (Figure 14.2). Excluding one 3 g Au/t analysis, which is likely a misidentified standard, the mean of the AAL standard assays is 0.5% lower than the certified value. This is entirely due to analyses of standards submitted with holes LC015 through LC037 (August 2006 through January 2007), however, as all of these analyses are lower than the certified value, with numerous failures. MDA has no evidence that any of the failures triggered re-assaying of the accompanying drill samples.

Figure 14.2 MEG Standard Results



Uncertified Standards. A total of 73 AAL analyses of the three Pittston standards accompany drill samples from holes 47 holes in the sequence LC015 through LC067C (Figure 14.3). Seven of the analyses are failures, one of which triggered re-assaying of the associated drill samples. The results for standards PQ-2 and PQ-4 average 6% and 2% higher than the certified values, respectively; there are insufficient analyses of PQ-10 for meaningful comparisons. When considering the results of the Pittston standards, it is important to remember that the standards did not undergo round-robin testing and are not certified.

Figure 14.3 Pittston Analytical Standard Results



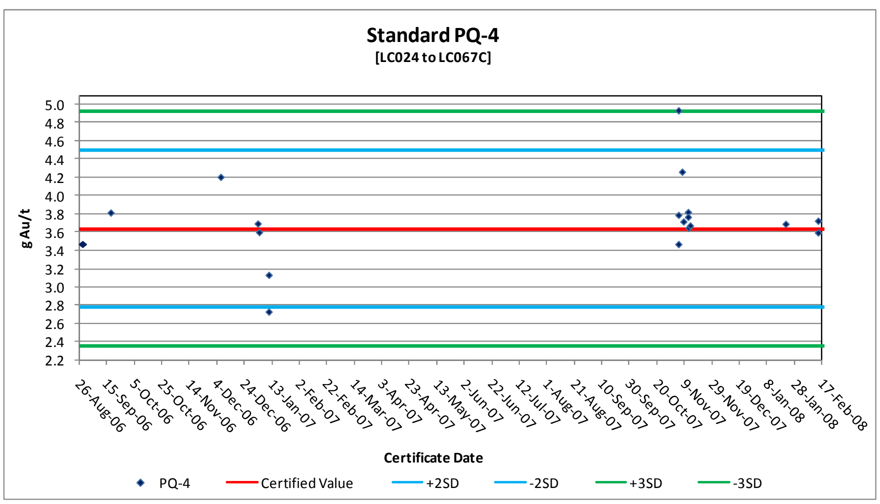
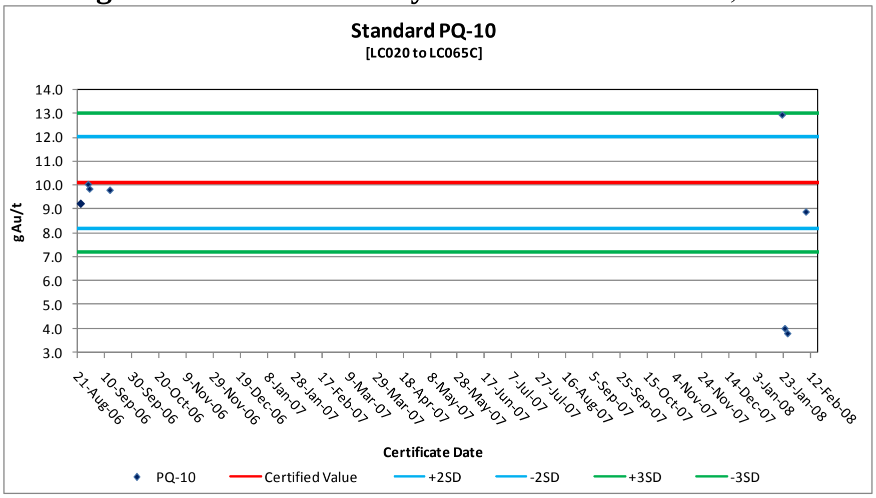


Figure 14.3 Pittston Analytical Standard Results, cont.



Fire-Assay Pulp Checks. A total of 393 original AAL pulps were sent to Chemex for check assaying of the fire-assay gold determinations. The pulps were derived from drill samples from 113 of the holes in the sequence LC031 through LC220.

Figure 14.4 is a graph that shows the difference, plotted on the y-axis, of each check assay relative to the original assay. The x-axis of the graph plots the means of the paired data, with each pair consisting of an original-assay and the corresponding check assays. The red line is a moving average and provides a visual guide to the trend of the relative differences. The graph shows high variability in the data up to about 0.09 g Au/t, which is expected due to the lack of analytical precision at lower gold concentrations. The check assays compare well with the original assays at higher grades.

Descriptive statistics of the paired data are summarized in Table 14.3. The check assays compare very well with the original assays throughout a range of cutoffs.

Figure 14.4 Chemex Checks Relative to Original AAL Assays

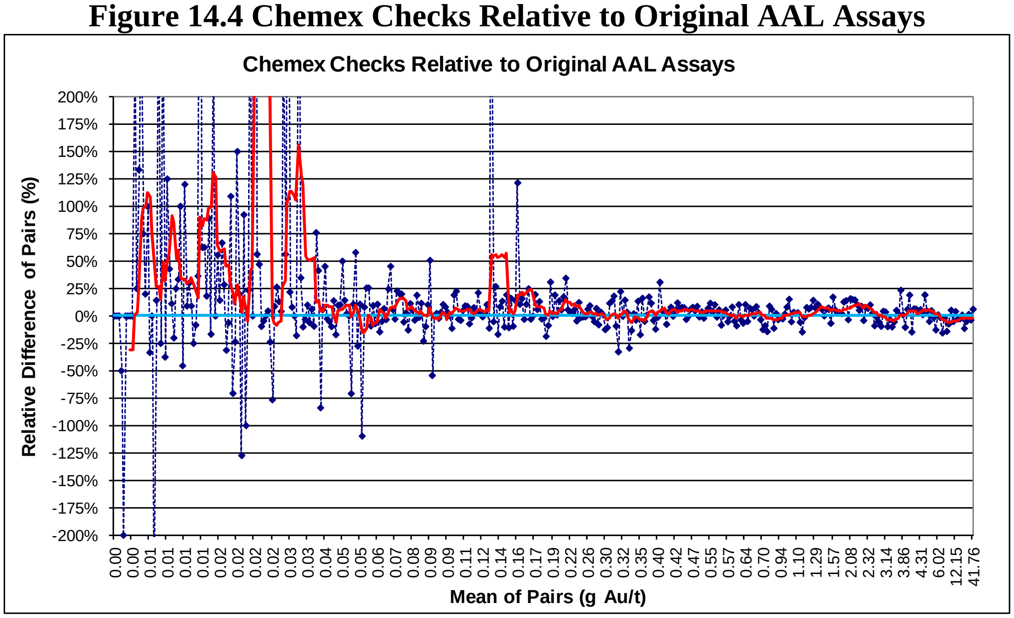


Table 14.3 Chemex Checks *vs.* AAL Original Assays

All Pairs	Mean	Original	Check	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	393	393	393		393	393
Mean	1.189	1.192	1.198	1%	19%	31%
Std. Dev.	3.324	3.332	3.358			
CV	2.795	2.796	2.802			
Min.	0.002	0.002	0.002	0%		0%
Max.	41.765	40.529	43.000	6%		1850%

Mean ≥0.2	Mean	Original	Check	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	192	192	192		192	192
Mean	2.371	2.379	2.388	0%	2%	7%
Std. Dev.	4.464	4.474	4.512			
CV	1.883	1.881	1.889			
Min.	0.206	0.173	0.206	19%		0%
Max.	41.765	40.529	43.000	6%		34%

Mean ≥0.5	Mean	Original	Check	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	125	125	125		125	125
Mean	3.464	3.479	3.488	0%	2%	7%
Std. Dev.	5.219	5.228	5.278			
CV	1.507	1.503	1.513			
Min.	0.514	0.498	0.523	5%		0%
Max.	41.765	40.529	43.000	6%		24%

Mean ≥1.0	Mean	Original	Check	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	86	86	86		86	86
Mean	4.735	4.757	4.770	0%	2%	7%
Std. Dev.	5.872	5.879	5.941			
CV	1.240	1.236	1.246			
Min.	1.016	0.955	1.055	10%		0%
Max.	41.765	40.529	43.000	6%		24%

Mean ≥2.0	Mean	Original	Check	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	58	58	58		58	58
Mean	6.345	6.398	6.383	0%	1%	7%
Std. Dev.	6.578	6.564	6.667			
CV	1.037	1.026	1.045			
Min.	2.045	1.926	2.010	4%		1%
Max.	41.765	40.529	43.000	6%		24%

CV = coefficient of variation = (Std Dev/Mean); A.V. = absolute value

Chemex assayed the primary drill samples from some of the late-2008 holes. A total of 69 of the original Chemex pulps were sent to AAL for check assaying (Figure 14.5 and Table 14.4).

The mean of AAL check assays is 7% higher than the mean of the original Chemex analyses, although the difference drops to 1% higher if the two highest-grade sample pairs are removed. There are insufficient pairs at grades of interest (>0.2 g Au/t) for definitive conclusions to be drawn, however.

Figure 14.5 AAL Checks Relative to Chemex Original Assays

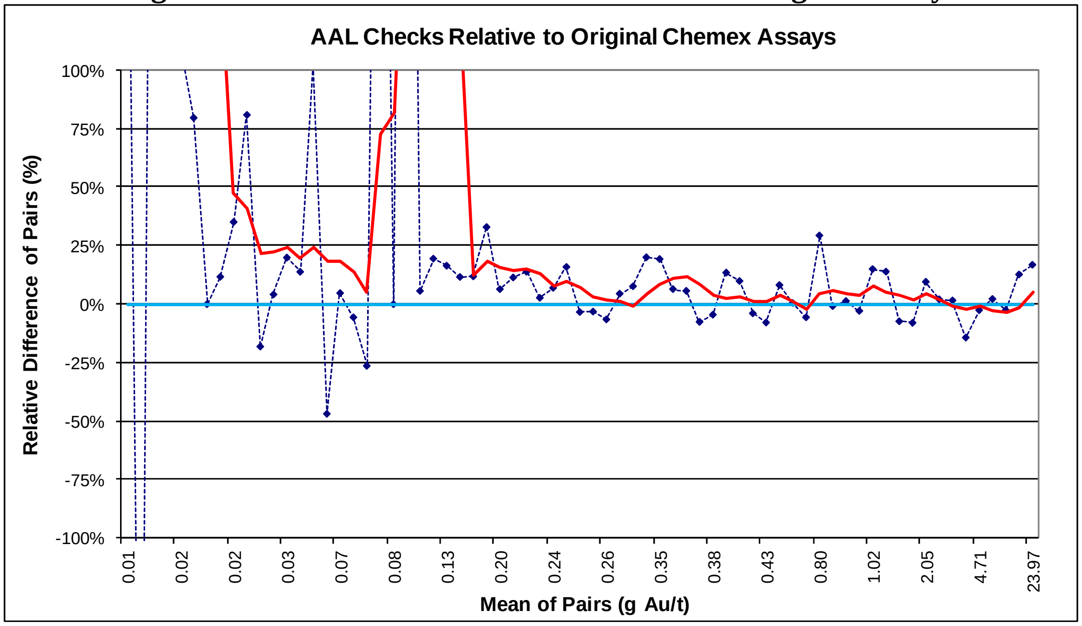


Table 14.4 AAL Checks *vs.* Original Chemex Assays

All Pairs	Mean	Original	Check	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	69	69	69		69	69
Mean	1.374	1.330	1.417	7%	37%	51%
Std. Dev.	3.744	3.544	3.948			
CV	2.726	2.665	2.786			
Min.	0.005	0.002	0.002	0%		0%
Max.	22.235	20.500	23.970	17%		600%

Mean ≥0.2	Mean	Original	Check	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	39	39	39		39	39
Mean	2.379	2.308	2.451	6%	4%	8%
Std. Dev.	4.764	4.497	5.037			
CV	2.002	1.948	2.056			
Min.	0.223	0.208	0.226	9%		1%
Max.	22.235	20.500	20.500	0%		29%

Cyanide-Soluble Pulp Checks. As part of the fire-assay pulp-check program, Chemex also performed cyanide-soluble check analyses on 147 samples (Figure 14.6 and Table 14.5). The Chemex check analyses are systematically (7%) higher than the original AAL cyanide-soluble assays. The determination methods of the two laboratories are not identical, which may explain at least part of the discrepancy.

Figure 14.6 Chemex Cyanide-Soluble Checks Relative to Original AAL Assays

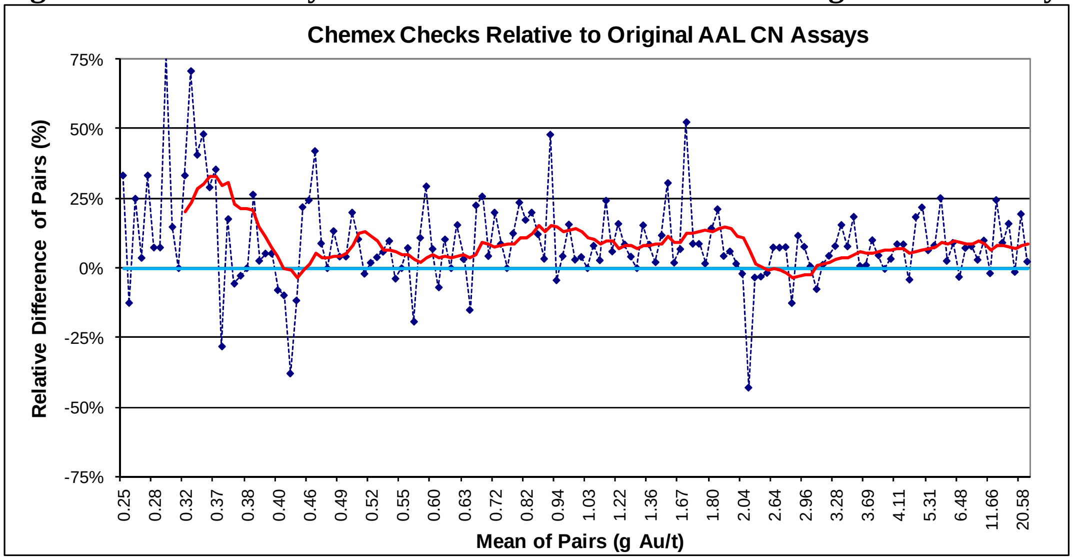


Table 14.5 Chemex Cyanide-Soluble Checks *vs.* AAL Original Assays

All Pairs	Mean	Original	Check	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	147	147	147		147	147
Mean	2.631	2.536	2.725	7%	9%	13%
Std. Dev.	4.690	4.548	4.841			
CV	1.783	1.793	1.776			
Min.	0.245	0.210	0.240	14%		0%
Max.	40.525	40.050	41.000	2%		76%

Mean ≥0.2	Mean	Original	Check	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	147	147	147		147	147
Mean	2.631	2.536	2.725	7%	9%	13%
Std. Dev.	4.690	4.548	4.841			
CV	1.783	1.793	1.776			
Min.	0.245	0.210	0.240	14%		0%
Max.	40.525	40.050	41.000	2%		76%

Mean ≥0.5	Mean	Original	Check	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	110	110	110		110	110
Mean	3.391	3.271	3.511	7%	8%	10%
Std. Dev.	5.210	5.053	5.377			
CV	1.536	1.545	1.531			
Min.	0.495	0.450	0.500	11%		0%
Max.	40.525	40.050	41.000	2%		52%

Mean ≥1.0	Mean	Original	Check	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	74	74	74		74	74
Mean	4.711	4.548	4.875	7%	7%	9%
Std. Dev.	5.926	5.751	6.115			
CV	1.258	1.265	1.254			
Min.	1.005	0.990	1.020	3%		0%
Max.	40.525	40.050	41.000	2%		52%

Mean ≥2.0	Mean	Original	Check	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	47	47	47		47	47
Mean	6.583	6.365	6.800	7%	5%	9%
Std. Dev.	6.773	6.572	6.992			
CV	1.029	1.032	1.028			
Min.	2.040	2.060	1.700	-17%		0%
Max.	40.525	40.050	41.000	2%		43%

Duplicate Pulps. Duplicate pulps are new pulps prepared from splits of the original coarse rejects created during the first crushing and splitting stage of the primary drill samples. Duplicate-pulp data provide information about the sub-sampling variance introduced during this stage of sample preparation.

The Long Canyon duplicate-pulp samples are derived from the coarse rejects of samples from 44 holes in the sequence LC037 to LC118. Comparisons of the AAL analyses of these duplicate pulps relative to the original AAL assays are shown in Figure 14.7 and Table 14.6.

Figure 14.7 AAL Duplicate Pulps Relative to Original AAL Assays

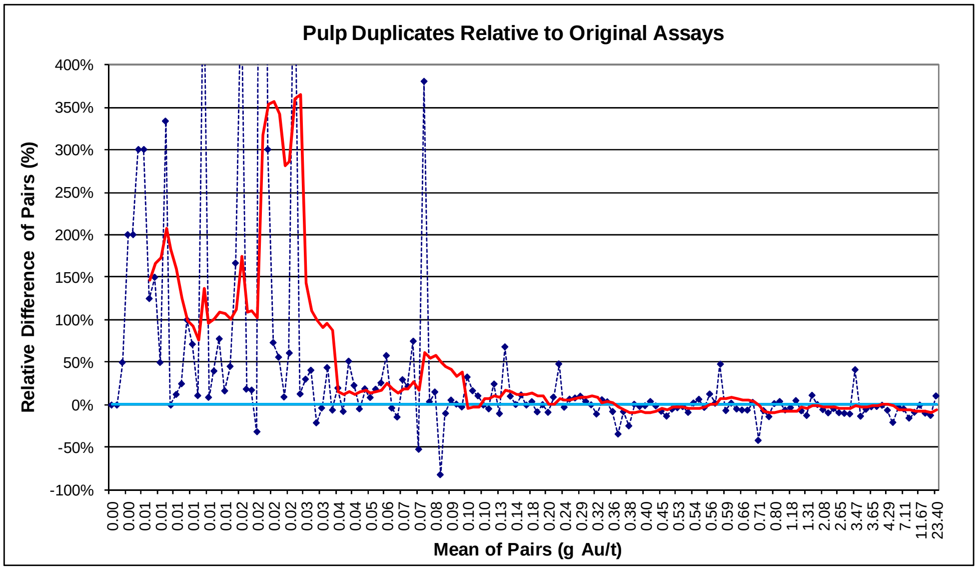


Table 14.6 AAL Duplicate Pulps *vs.* AAL Original Assays

All Pairs	Mean	Original	Dup. Pulp	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	154	154	154		154	154
Mean	1.137	1.152	1.122	-3%	45%	53%
Std. Dev.	2.992	3.010	2.982			
CV	2.632	2.613	2.659			
Min.	0.002	0.002	0.002	0%		0%
Max.	23.397	22.197	24.597	11%		1800%

Mean ≥0.2	Mean	Original	Dup. Pulp	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	72	72	72		72	72
Mean	2.371	2.408	2.334	-3%	-2%	9%
Std. Dev.	4.048	4.065	4.044			
CV	1.707	1.688	1.733			
Min.	0.213	0.178	0.222	25%		0%
Max.	23.397	22.197	24.597	11%		48%

Mean ≥0.5	Mean	Original	Dup. Pulp	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	49	49	49		49	49
Mean	3.320	3.373	3.268	-3%	-2%	9%
Std. Dev.	4.621	4.633	4.627			
CV	1.392	1.374	1.416			
Min.	0.528	0.458	0.512	12%		0%
Max.	23.397	22.197	24.597	11%		48%

The descriptive statistics indicate that the duplicate-pulp assays are slightly lower than the assays of the original pulps, with the relative difference plot showing that this discrepancy is due to a low bias that is prevalent at grades greater than about 0.35 g Au/t.

Field Duplicates. Field duplicates are secondary splits of drill samples. In the case of core drilling, field duplicates are obtained by re-splitting the core remaining after the primary samples have been taken. The RC field duplicates are splits of the cuttings collected at the drill rig at the same time as the primary samples. Field duplicates are mainly used to assess inherent geologic variability and sampling variance.

Fronteer submitted a total of 446 field duplicate samples from all holes beginning with LC040 except for LC050, 051, 061, and 126.

The RC duplicate data analyzed by AAL are compared to the original AAL analyses in Figure 14.8 and Table 14.7 after the removal of 17 outlier pairs. All of the outlier pairs have means less than <0.2 g Au/t, and the absence of the pairs does not affect the statistical comparisons.

The mean of the RC field duplicates is 5% lower than the mean of the original analyses, although more data at meaningful grades are needed to establish statistically meaningful conclusions.

Figure 14.8 RC Field Duplicates Relative to Original Assays – AAL

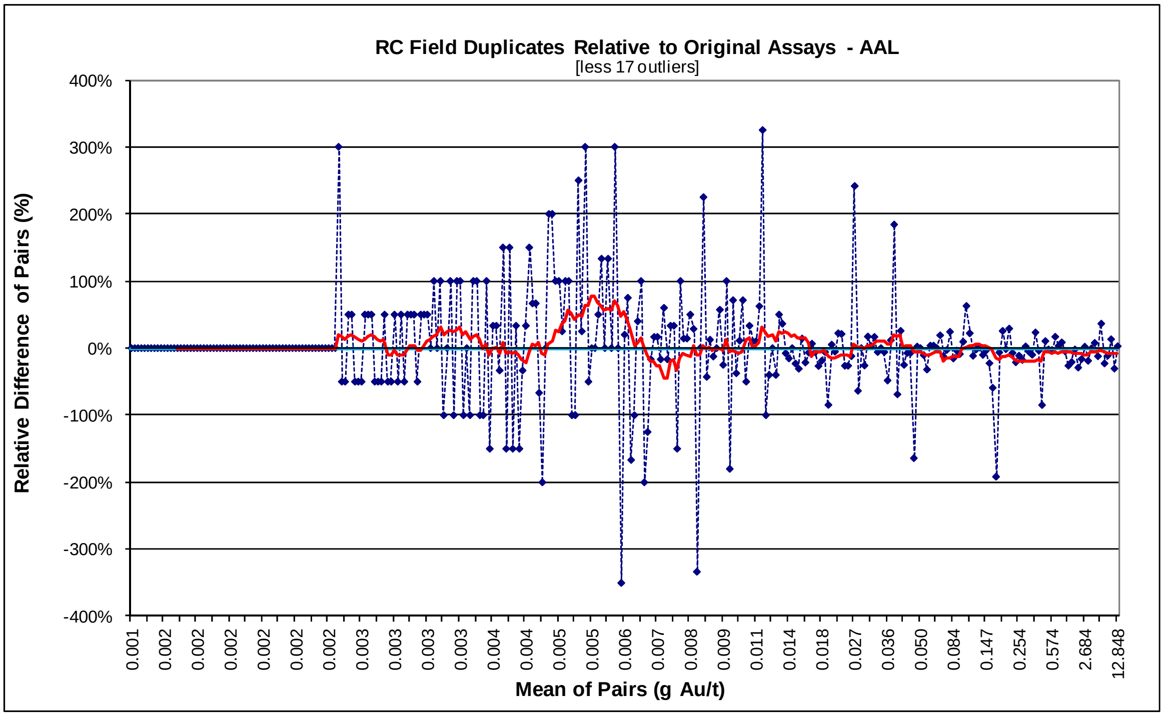


Table 14.7 RC Field Duplicates *vs.* Original Assays – AAL

All Pairs	Mean	Original	Field Dup.	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	296	296	296		296	296
Mean	0.305	0.311	0.298	-4%	3%	43%
Std. Dev.	1.322	1.355	1.298			
CV	4.339	4.351	4.357			
Min.	0.002	0.002	0.002	0%		0%
Max.	12.848	12.665	13.030	3%		350%

Mean ≥0.2	Mean	Original	Field Dup.	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	33	33	33		33	33
Mean	2.590	2.647	2.533	-4%	-6%	14%
Std. Dev.	3.170	3.254	3.120			
CV	1.224	1.230	1.232			
Min.	0.205	0.179	0.210	17%		0%
Max.	12.848	12.665	13.030	3%		85%

The AAL analyses of core duplicates are compared to the original AAL assays in Figure 14.9 and Table 14.8 after the removal of four outlier pairs.

Figure 14.9 Core Field Duplicates Relative to Original Assays - AAL

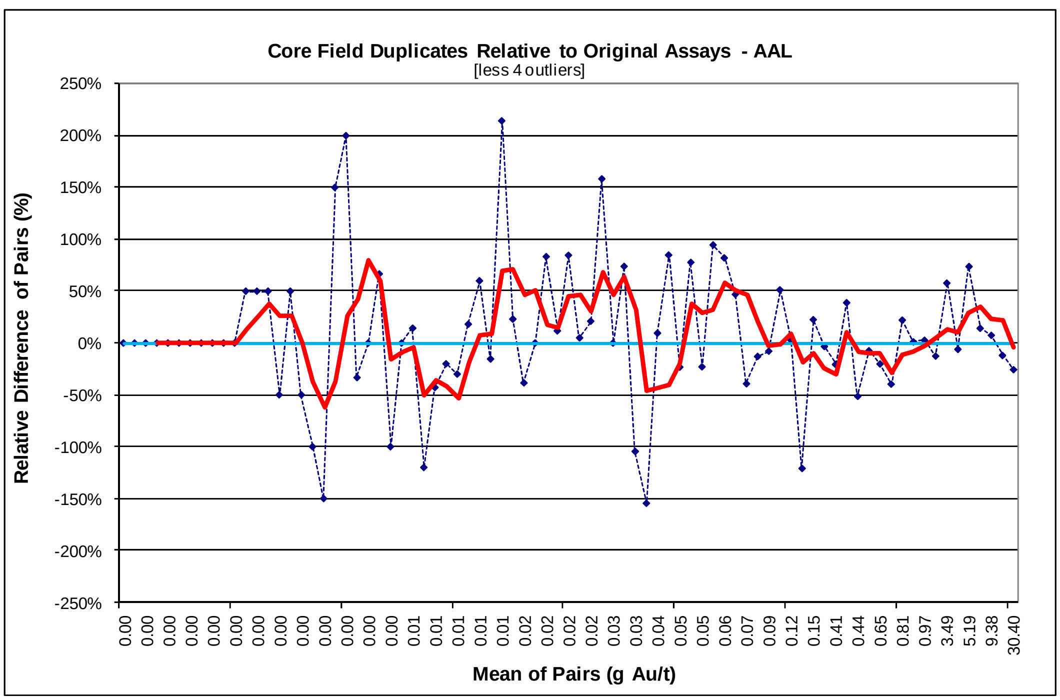


Table 14.8 Core Field Duplicates *vs.* Original Assays – AAL

All Pairs	Mean	Original	Field Dup.	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	81	81	81		81	81
Mean	1.099	1.120	1.077	-4%	8%	43%
Std. Dev.	4.133	4.459	3.832			
CV	3.762	3.980	3.559			
Min.	0.002	0.002	0.002	0%		0%
Max.	30.402	33.863	26.940	-20%		214%

Mean ≥0.2	Mean	Original	Field Dup.	Diff.	Rel. Diff.	A.V. Rel. Diff.
Count	14	14	14		14	14
Mean	6.128	6.253	6.003	-4%	4%	22%
Std. Dev.	8.493	9.381	7.662			
CV	1.386	1.500	1.276			
Min.	0.506	0.524	0.488	-7%		1%
Max.	30.402	33.863	26.940	-20%		74%

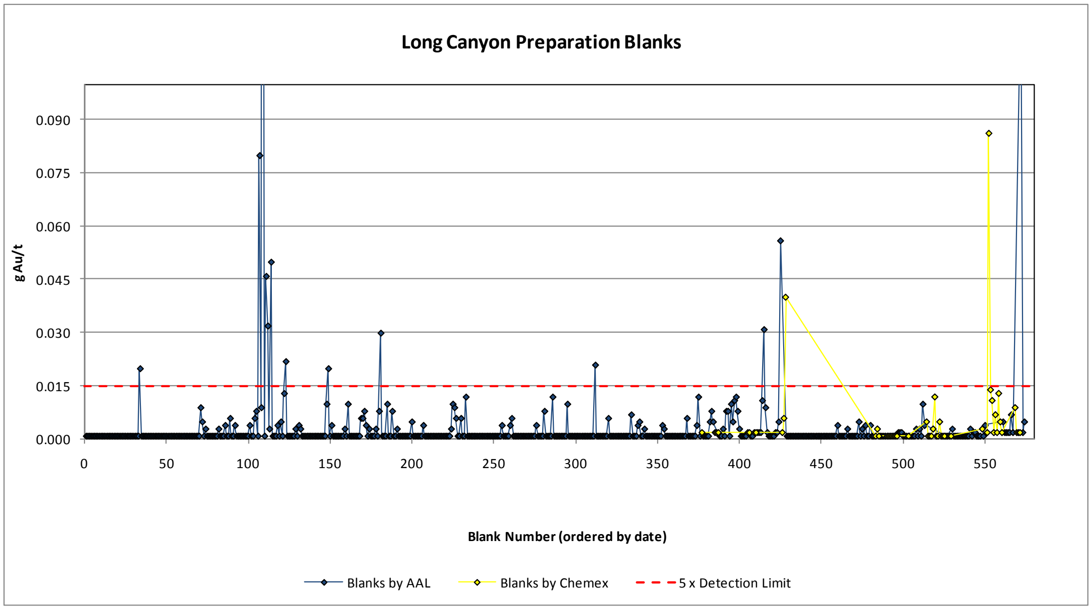
The mean of the duplicate core analyses is 4% lower than the mean of the original assays, but there are far too few samples at meaningful grades.

There are insufficient Chemex analyses of RC field duplicates (16) and core field duplicates (27) for meaningful statistical analysis, especially at grades of interest, but the available data do not show anomalous relationships.

Preparation Blanks. Preparation blanks are coarse samples of barren material that are used to detect possible laboratory contamination, which is most common during sample-preparation stages. In order for analyses of blanks to be meaningful, therefore, they must be sufficiently coarse to require the same crushing stages as the drill samples. It is also important for blanks to be placed in the sample stream immediately after mineralized samples (which would be the source of most cross-contamination issues). Blank results that are greater than five times the detection limit are typically considered failures that require further investigation and possible re-assay of associated drill samples.

The Joint Venture has used coarse blank material from a bulk sample of barren rhyolite originally acquired by AuEx from MEG. Figure 14.10 displays the 574 analyses of preparation blank samples submitted with the drill samples from all Joint Venture holes except for LC164C. The blanks are coloured to identify the assay laboratory and are ordered by date of analysis on the x-axis. There are 13 failures out of 523 AAL analyses and two Chemex failures out of 51 analyses.

Figure 14.10 Blank Analyses



Correlations between anomalously high blank assays and the assays of drill samples that preceded the anomalous blanks provide good evidence of cross contamination. This relationship is not evident with the AAL analyses (Figure 14.11; note low R^2 value), but the limited Chemex data indicate that cross contamination may have been a problem (Figure 14.12).

Figure 14.11 AAL Blank Analyses *vs.* Grade of Previous Sample

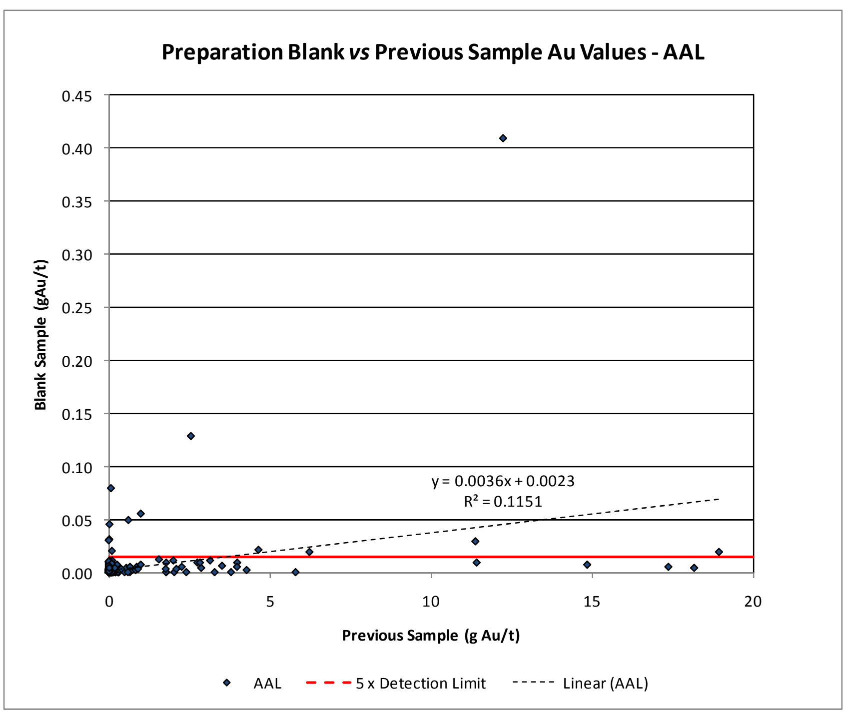
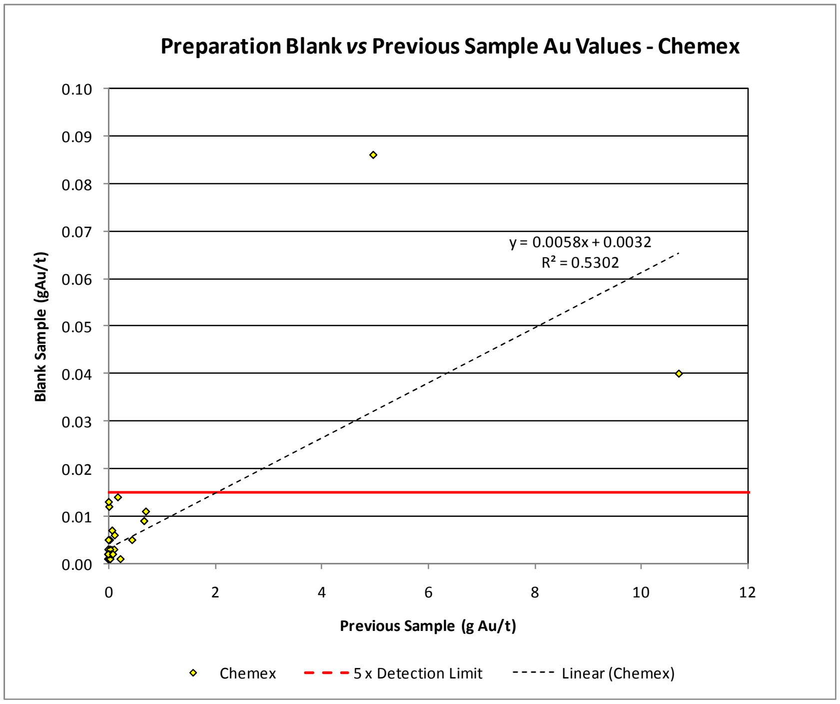


Figure 14.12 Chemex Blank Analyses *vs.* Grade of Previous Sample



<u>Analytical Blanks</u>. Analytical blanks are similar to preparation blanks, with the important difference being that analytical blanks are submitted to the laboratories as pulps, and therefore require no sample preparation. Analytical blanks can only be used to check laboratory accuracy of analyses of material that has gold concentrations less than the detection limit.

AuEx purchased analytical blank material from MEG. MDA has reviewed AAL analyses of 57 analytical blanks that were inserted into the drill-sample stream of 38 holes in the sequence LC015 to LC061. Three of the analyses exceeded the detection limit (0.004, 0.005, and 0.012 g Au/t).

14.2 Pittston and AuEx QA/QC Programs

MDA does not have any QA/QC data derived from the drilling programs completed prior to the Fronteer-AuEx Joint Venture.

14.3 Discussion of QA/QC Results

The AAL analyses of the various certified reference standards inserted by the Joint Venture are generally 1 to 3% lower than the certified values. The Chemex analyses of the same standards are also lower, although slightly less so than AAL, but there are insufficient data to form definitive conclusions. Chemex check analyses agree well with the original AAL fire assays. Other than the strong evidence of analytical drift in the AAL analyses, there is no evidence of significant problems with the gold fire-assay database.

While no serious issues are indicated by the duplicate pulp and field-duplicate data, these should continue to be routinely collected. The field-duplicate data require additional sample pairs to allow for meaningful statistical analyses. The available duplicate-pulp analyses are slightly, but systematically, lower than assays of the original pulps. Additional data should help in identifying any issues.

The preparation blank dataset has identified a cross contamination issue with the Chemex analyses that may have affected the relatively small amount of drill-samples analyzed by Chemex. This should be closely monitored in the future.

MDA recommends that the QA/QC data are monitored more carefully in future drilling programs. For example, instead of merely applying pass/fail logic to standard analyses, the evaluation of analytical drift and systematic bias should also be incorporated into the program. All QA/QC failures should be immediately investigated and, when appropriate, they should trigger re-assaying of the relevant samples.

All blank material inserted into the sample stream should be restricted to preparation blanks.

There is limited QA/QC data available from the Pittston and AuEx drilling programs. A check-assaying program using available pulps and coarse rejects from these programs should be considered.

14.4 Assay Database Audit

MDA obtained original digital assay certificates from AAL and Chemex for all Joint Venture and AuEx holes drilled at Long Canyon. These data were then imported into the project database using non-manual methods. MDA used paper copies of the original assay certificates from the seven Pittston holes to manually enter the data, as digital assay certificates were not available. The manually entered data were then compared against the Pittston assays in Fronteer's project database, in which the data were also entered by hand, and the resulting discrepancies were resolved.

14.5 Independent Verification of Mineralization

MDA. On May 23, 2006 Paul Tietz of Mine Development Associates ("MDA") collected 10 samples from road cuts previously sampled by AuEx at the Long Canyon project site. MDA maintained custody of the samples and delivered them directly to the facility of AAL in Sparks, Nevada for assaying. Gold was determined by 30-gram fire assaying with both AA and gravimetric finishes. Descriptions of the MDA samples, as well as a comparison of the assay results from the MDA and AuEx assays are described in Table 14.9.

The dataset is only sufficient to confirm the presence of gold mineralization in concentrations similar to those in the project drill-hole database.

Michael Gustin also visited the Long Canyon project on November 15, 2006 and July 15, 2008. The site visits included reviews of (1) mineralized core and RC chips; (2) drill-hole cross sections showing the geologic model; (3) representative exposures in road cuts and outcrops; and (4) inspection of sampling and logging procedures at active RC and core drill sites and in the project field office.

Table 14.9 Long Canyon Independent Sampling – MDA

Sample ID	UTM Easting	UTM Northing	Description	AuEx Au Results (ppm)	MDA Au FA30 (ppm)	MDA Au FAG (ppm)
LC-PT-1	4,538,739	707,941	Select 7.5m grab from road cut	1.3 to 7.54	4.90	5.01
LC-PT-2	4,538,707	707,951	6m chip sample	9.70 to 13.20	9.85	10.49
LC-PT-3	4,538,709	707,957	3m chip sample	7.60 to 9.39	8.44	8.81
LC-PT-4	4,538,611	707,853	Select 3m grab from road cut	0.32 to 2.74	0.72	0.62
LC-PT-5	4,538,581	707,833	Select 7.5m grab from road cut	0.68 to 1.39	0.84	0.75
LC-PT-6	4,538,570	707,826	4.5m chip sample	1.52 to 2.77	2.75	2.91
LC-PT-7	4,538,515	707,789	3m chip sample	2.09 to 4.84	1.88	1.75
LC-PT-8	4,538,471	707,712	4.5m chip sample	4.18 to 18.00	16.75	17.14
LC-PT-9	4,538,471	707,712	Select grab of excavated cobbles	4.18 to 18.00	15.88	16.66
LC-PT-10	4,538,442	707,787	Select grab from altered fracture zone	No data	0.19	0.21

SRK. As described in Moran (2008), SRK confirmed the presence of gold by collecting and analyzing six samples (Table 14.10). The following description of Allan Moran's independent sampling is taken from the 2008 Technical Report:

"The author collected 7 [sic] *surface rock samples in 2004 to verify gold mineralization in outcrops and road cuts. These samples are not exact replicates of previous Pittston samples, so direct assay comparison is not presented. The samples verify the presence of gold and the associated trace elements reported for Long Canyon."*

Table 14.10 Long Canyon 2004 Independent Sampling - SRK
(from Moran, 2008)

Sample	UTM N	UTM E (11)	Au ppm	As ppm	Sb ppm	Hg ppm	Tl ppm	W ppm	Comments
AMP-09	4538708	0707954	12.34	436	30	11.00	7.24	4	L.C., Rd-cut, hem limestone
AMP-10	4538698	0707951	6.00	244	5	5.51	9.40	3	L.C., Rd-cut, hem limestone
AMP-11	4538699	0707946	26.33	321	43	13.60	4.51	5	L.C., Rd-cut, hem limestone
AMP-12	4538574	0707838	0.87	89	6	3.21	1.06	2	L.C., Rd-cut, hem limestone
AMP-13	4538507	0707787	3.02	81	10	1.42	2.19	7	L.C., Rd-cut, hem limestone
AMP-14	4538474	0707709	6.03	67	304	8.98	1.48	9	L.C., Jasperoid, silic. flt-bx

15.0 ADJACENT PROPERTIES

The West Pequop project is immediately adjacent to and contiguous with the Long Canyon project. West Pequop is controlled by a joint venture between AuEx and Agnico-Eagle Mines Limited. The West Pequop project, which is described in an NI 43-101 technical report (Moran, 2005), is relevant to the Long Canyon due to the presence of gold mineralization of potential economic interest, similar geochemical signature, and in similar host rocks and structural settings as at Long Canyon.

A number of public sections to the north and south of the Long Canyon Joint Venture area are controlled by a joint venture between Agnico-Eagle and Columbus Gold. Of note is Section 16, located immediately north of Section 21 in the Joint Venture Area of Interest (Figure 4.2), which is on trend with mineralization at Long Canyon. Agnico-Eagle drilled three holes in the southern portion of Section 16 in late 2008, and reported low but anomalous gold values in a recent press release.

16.0 MINERAL PROCESSING AND METALLURGICAL TESTING

16.1 Summary

Four bulk samples of surficial mineralized material were collected in twenty 55-gallon drums from road cuts. These samples, representing both breccia and stratiform mineralization that is hosted in limestone and dolomite, were sent to McClelland Laboratories, Inc. ("McClelland") for preliminary metallurgical testing in early 2009. A report by McClelland that summarizes the results is used as the primary basis for the metallurgical summary provided below.

A large dataset of drill samples with fire assay and cyanide-soluble gold analyses is also available. In addition, core samples have been submitted for metallurgical testing at McClelland, with a report of results scheduled to be finalized in December 2009.

Results from the limited test data presently available suggest that Long Canyon mineralized material tested to date is amenable to extraction of gold by cyanidation via oxide milling or heap leaching methods. This conclusion is used to support the Mineral Resource cutoff grade and the preliminary economic assessment discussed in Sections 17.0 and 18.0, respectively.

16.2 Head Assays

Sample splits from the four bulk samples were submitted to ALS Chemex for assay using conventional fire-assay fusion procedures to determine gold and silver content. Composite head samples were submitted for cyanide (CN) soluble gold, total sulfur (S), sulfide sulfur, arsenic, organic carbon (C), carbonate, mercury, ICP, and "classical whole rock" analyses. Select analyses are presented in Table 16.1.

Table 16.1 Head Assay Results on Long Canyon Bulk Samples

Bulk Sample #	Sample Description	Au (g/t)	AuCN (g/t)	AuCN Solubility[1] (%)	Ag (g/t)	S(total) (%)	C(organic) (%)
#1	**Cnpl(bx) -** Notch Peak Limestone (Breccia)	18.55	17.70	95.4	0.60	<0.01	0.07
#2	**Cnpl(bx) -** Notch Peak Limestone (Breccia)	2.42	2.36	97.5	0.12	<0.01	0.05
#3	**Cnpl -** Notch Peak Limestone (Stratiform)	14.80	14.50	98.0	0.14	<0.01	0.09
#4	**Opl -** Pogonip Limestone (Stratiform)	1.82	1.84	100.0	0.05	<0.01	0.06

1. **AuCN Solubility = AuCN/Au, expressed as percent.**

Based on data available as of the Effective Date of this report, the Long Canyon deposit can be generally characterized as:

1. highly oxidized, as exhibited by the absence of sulfur;
2. non preg-robbing, as exhibited by the very low levels of organic carbon;
3. having high gold cyanide solubility, as exhibited by the AuCN solubility percent values; and
4. very low in silver.

These general comments take into account additional information reviewed from the resource drill database, and therefore are not solely based upon data and results obtained from the four bulk samples. High gold cyanide solubility, low total sulfur, and low silver content are characteristic of the mineralization, in general, including samples analyzed from significant depths in the drill holes.

16.3 Bottle-Roll Tests

Direct agitated cyanidation (bottle roll) tests were conducted on the Long Canyon bulk samples at feed sizes of 80% -180µm and -106µm feed sizes to determine gold recovery, recovery rate, and reagent requirements. Sample charges were stage ground to the desired feed sizes using laboratory steel ball mills. Milled feeds were settled in grinding water to achieve 40 weight percent solids, and natural pulp pH was measured on each sample. Lime was added to adjust the pH of the pulps to between 10.5 and 11.0, and sodium cyanide, equivalent to 0.5 g NaCN/L of solution, was then added to the alkaline pulps. Leaching was conducted by rolling the pulps in bottles on the laboratory rolls for 72 hours. Overall metallurgical results from the direct agitated bottle roll tests are provided in Table 16.2 and Table 16.3. Corresponding gold leach-rate profiles are shown graphically in Figure 16.1 and Figure 16.2.

Table 16.2 Overall Bottle-Roll Test Results, Bulk Samples #1 and #2

Metallurgical Result	Bulk Sample #1		Bulk Sample #2	
	P_{80} = 180µm	P_{80} = 106µm	P_{80} = 180µm	P_{80} = 106µm
Extraction: % of total Au				
In 24 hours	81.1	87.9	89.0	92.0
In 36 hours	85.0	89.9	89.5	92.1
In 48 hours	88.8	91.7	90.9	93.0
In 72 hours	87.1	91.9	90.0	93.2
Calculated Head (g Au/t)	17.58	17.83	2.51	2.51
Assay Head (g Au/t)	18.55	18.55	2.42	2.42
NaCN Consumed (kg/t)	<0.07	<0.07	<0.07	<0.07
Lime Added (kg/t)	1.3	1.1	1.1	1.2

Figure 16.1 Bottle Roll Leach-Rate Profiles, Bulk Samples #1 and #2

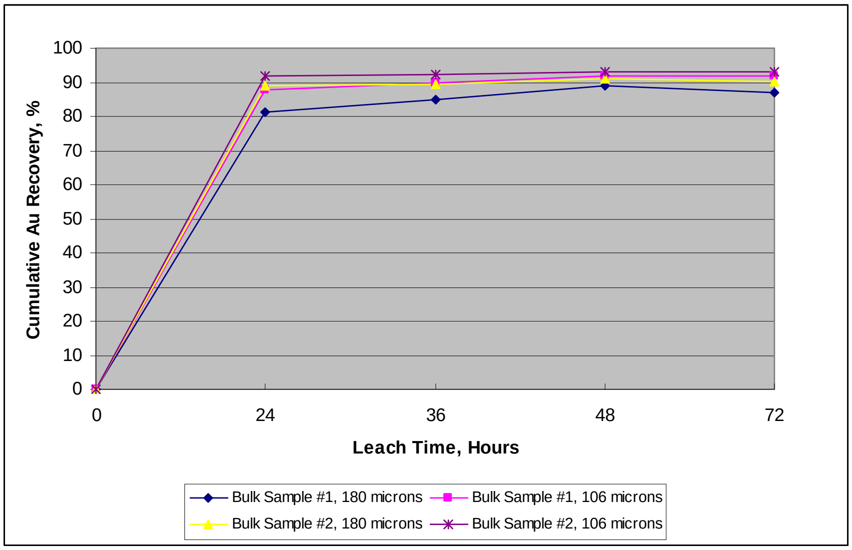
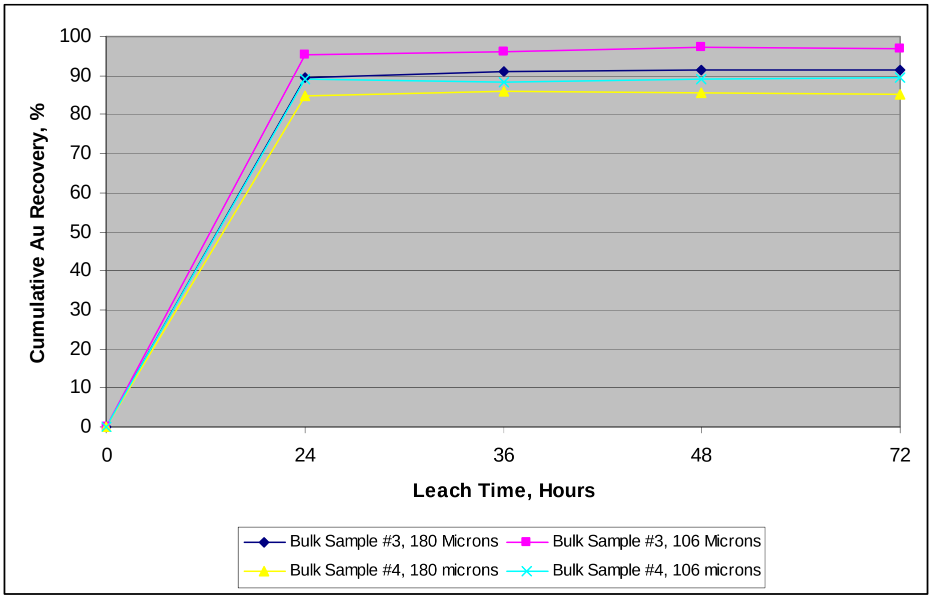


Table 16.3 Overall Bottle-Roll Test Results, Bulk Samples #3 and #4

Metallurgical Result	Bulk Sample #3		Bulk Sample #4	
	P_{80} = 180µm	P_{80} = 106µm	P_{80} = 180µm	P_{80} = 106µm
Extraction: % of total Au				
In 24 hours	89.4	95.2	84.8	89.0
In 36 hours	91.0	96.3	85.8	88.5
In 48 hours	91.4	97.1	85.7	89.1
In 72 hours	91.4	97.0	85.3	89.6
Calculated Head (g Au/t)	15.44	14.34	1.91	1.82
Assay Head (g Au/t)	14.80	14.80	1.82	1.82
NaCN Consumed (kg/t)	<0.07	<0.07	<0.07	<0.07
Lime Added (kg/t)	1.2	1.1	1.5	0.7

Figure 16.2 Bottle Roll Leach-Rate Profiles, Bulk Samples #3 and #4



Overall metallurgical results show that the Long Canyon bulk samples are readily amenable to direct agitated cyanidation treatment at the 80% -180µm and -106µm feed sizes. Gold recoveries obtained from the Long Canyon bulk samples at the -180µm feeds range from 85.3% to 91.4%, and average 88.5%, in 72 hours of leaching. Gold recoveries obtained from the -106µm feeds ranged from 89.6% to 97.0%, and averaged 92.9%, in 72 hours of leaching. Gold recovery rates were very rapid for all samples.

Cyanide consumptions were very low for all samples (<0.07 kg NaCN/t). Lime requirements were low, ranging from 0.7 kg/t to 1.5 kg/t.

16.4 Agglomerate Strength Testing

Prior to column-leach testing, agglomerate strength and stability tests were conducted on Bulk Sample #1 at the -25mm feed size to optimize agglomerating conditions for the Long Canyon bulk samples. Bulk Sample #1 was selected as a "worst-case" sample for agglomeration testing, because it had higher fines content (22.9% -150 µm) than the other samples.

Agglomeration test results showed that, of the binder additions evaluated, addition of 3.0 kg/t of cement to Bulk Sample #1 was optimum for agglomeration; agglomerates produced using lower cement or lime additions lacked sufficient strength to bind the fines in the mineralized sample. All four bulk samples were agglomerated with 3.0 kg/t cement, as a precautionary measure, to insure that no complications with solution percolation or compaction would be encountered during column leaching.

Even though the bulk sample column-leach test program employed agglomeration ahead of column leaching, there is no indication that commercially mined mineralization at Long Canyon will require agglomeration pre-treatment. Preliminary results from the current column-leach program, on-going at

McClelland using large-diameter core, show that the fines content in the new column charges are much lower than for the surface bulk samples, and the columns are being loaded without any need for agglomeration.

16.5 Column Leach Testing

Column percolation leach tests were conducted on the four surficial Long Canyon bulk samples at 100% -75mm and -25mm feed sizes to determine gold recovery, recovery rate, and reagent consumptions under simulated heap leaching conditions.

Column charges were agglomerated with 3.0 kg/t of cement. Leaching was conducted by applying cyanide solution (0.5 gNaCN/l) over the charges at a rate of 0.20 lpm/m^2 of column cross sectional area. Pregnant solutions were collected at 24-hour intervals, weighed, and assayed for gold and silver. Pregnant solutions were pumped through a three-stage carbon circuit for adsorption of precious metal values. Barren solutions, with appropriate make-up reagents, were recycled to the columns.

After leaching, fresh water rinsing was conducted to remove residual cyanide. Moisture required to saturate the column charges and retain moistures were determined. After rinsing, leached residues were air dried, blended, and split to obtain samples for triplicate tail assay.

Results of the column leach testing are summarized in Table 16.4, Table 16.5, Figure 16.3, and Figure 16.4.

Table 16.4 Overall Column Leach Test Results, Bulk Samples #1 and #2

Metallurgical Result	Bulk Sample #1		Bulk Sample #2	
	-75mm	-25mm	-75mm	-25mm
Extraction: % of total Au				
1st Effluent	10.3	2.0	18.9	5.8
In 5 days	76.3	84.3	75.4	86.0
In 10 days	86.2	87.5	84.7	88.4
In 15 days	87.7	87.9	86.2	88.8
In 20 days	88.4	88.1	87.2	89.1
In 30 days	89.1	88.3	88.0	89.3
In 40 days	89.2	88.5	88.2	89.4
In 50 days	89.2	88.6	88.2	89.6
In 60 days	89.4	88.6	88.4	89.6
End of Leach/Rinse	89.4	88.7	88.4	89.8
Calculated Head (g Au/t)	19.69	18.39	2.51	2.54
Assay Head (g Au/t)	18.55	18.55	2.42	2.42
NaCN Consumed (kg/t)	0.45	0.67	0.47	0.45
Cement Added (kg/t)	3.00	3.00	3.00	3.00
Leach/Rinse Cycle (days)	62	69	67	61

Figure 16.3 Column Leach-Rate Profiles, Bulk Samples #1 and #2

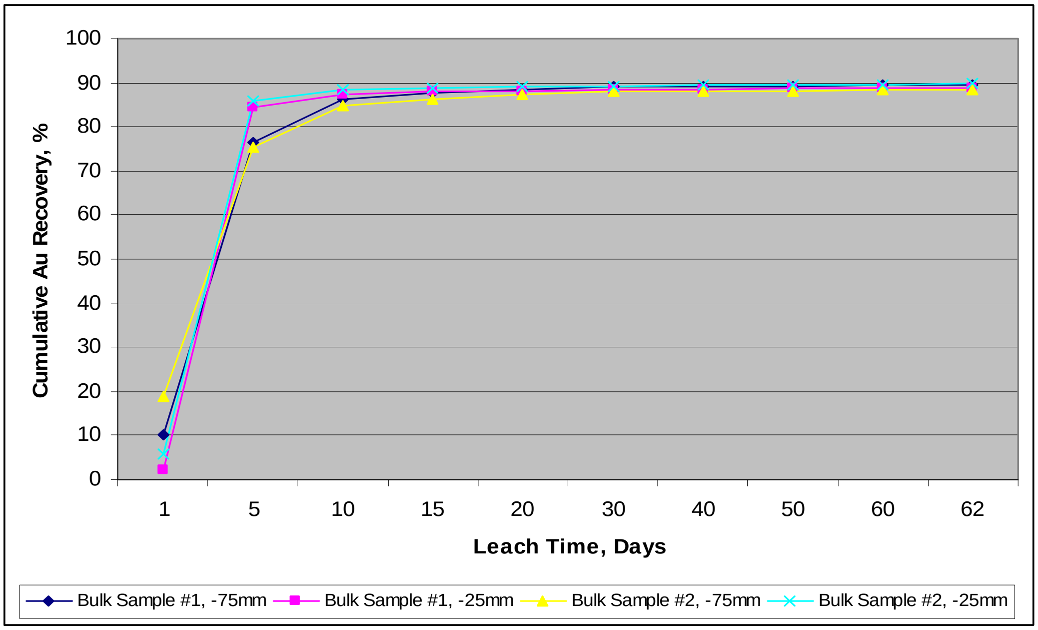
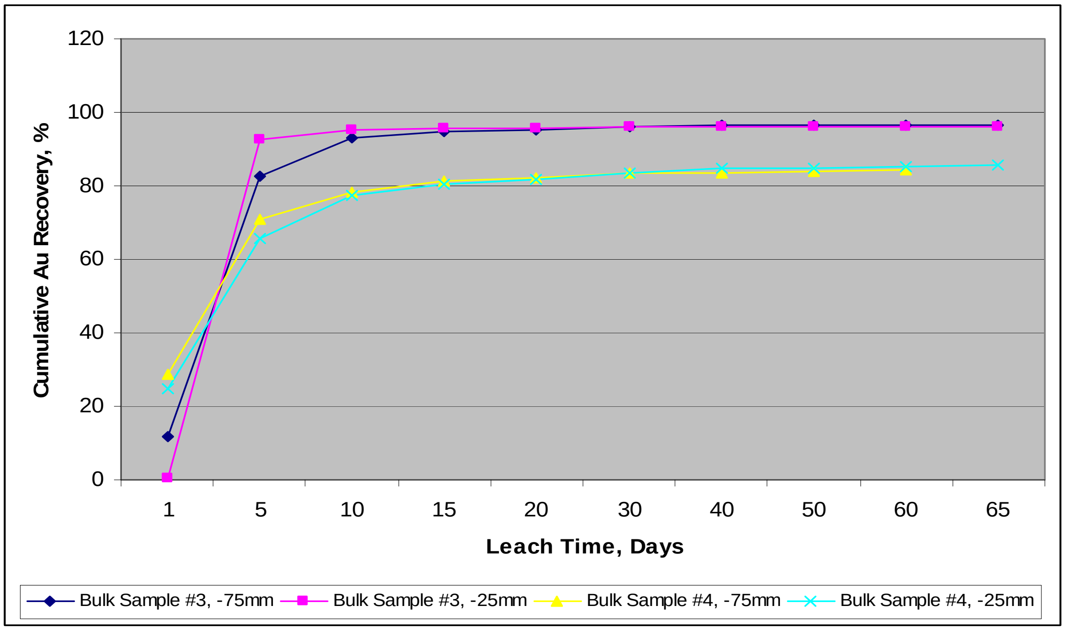


Table 16.5 Overall Column Leach Test Results, Bulk Samples #3 and #4

Metallurgical Result	Bulk Sample #3		Bulk Sample #4	
	-75mm	-25mm	-75mm	-25mm
Extraction: % of total Au				
1st Effluent	11.7	0.3	28.6	24.6
In 5 days	82.5	92.7	70.9	65.8
In 10 days	93.2	95.4	78.4	77.2
In 15 days	94.6	95.7	81.2	80.4
In 20 days	95.1	95.8	82.2	81.9
In 30 days	96.1	96.1	83.3	83.5
In 40 days	96.4	96.2	83.6	84.7
In 50 days	96.4	96.2	83.9	84.8
In 60 days	96.5	96.2	84.2	85.3
End of Leach/Rinse	96.6	96.3	84.2	85.6
Calculated Head (g Au/t)	14.87	13.25	2.03	2.02
Assay Head (g Au/t)	14.80	14.80	1.82	1.82
NaCN Consumed (kg/t)	0.40	0.59	0.25	0.48
Cement Added (kg/t)	3.00	3.00	3.00	3.00
Leach/Rinse Cycle (days)	65	69	60	69

Figure 16.4 Column Leach Rate Profiles, Bulk Samples #3 and #4



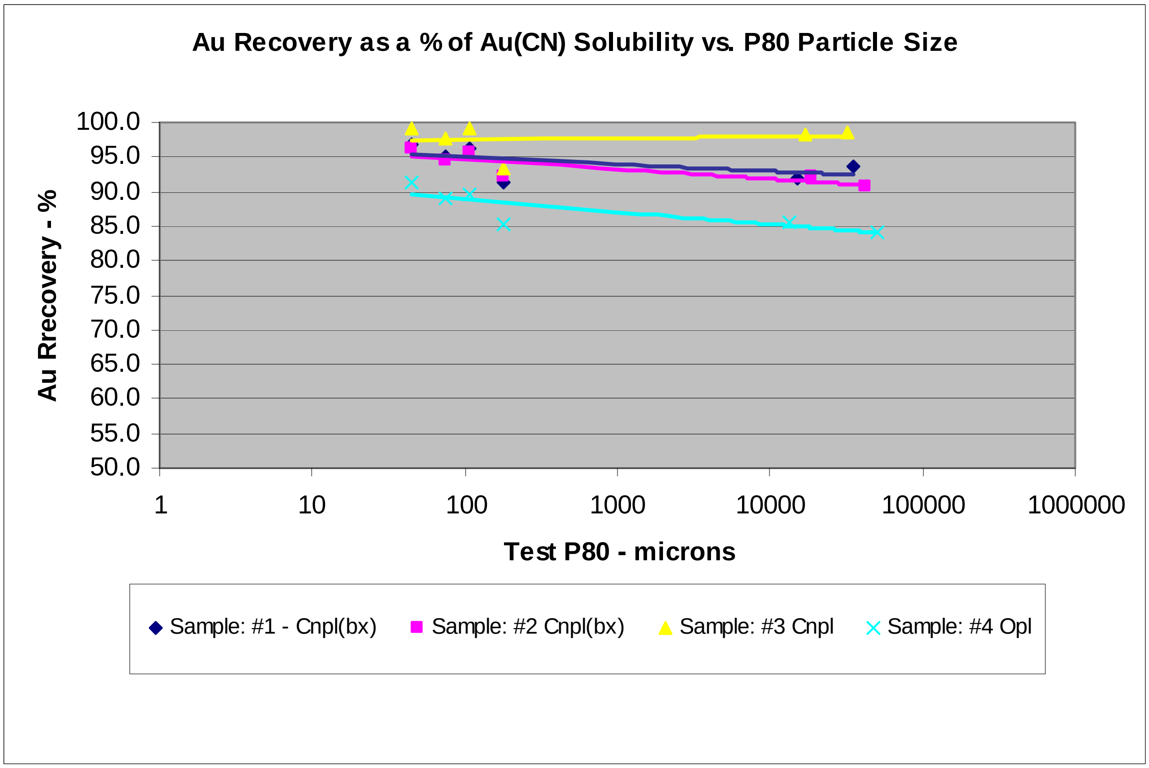
The Long Canyon bulk samples are amenable to simulated heap-leach cyanidation treatment at both feed sizes evaluated. Column test gold recoveries for the -75mm feed size ranged from 84.2% to 96.6%, and averaged 89.7%, in approximately 65 days of leaching and rinsing. Column test gold recoveries for the -25mm feed size ranged from 85.6% to 96.3%, and averaged 90.1%, in approximately 69 days of leaching and rinsing. Gold recovery rates for all samples were very rapid, and gold extraction was substantially complete in 10 to 15 days of leaching.

Cyanide consumptions were low. The average cyanide consumptions for the -75mm and -25mm feeds were 0.39 and 0.55 kg NaCN/t, respectively. Column-test cyanide consumptions are usually higher than experienced in commercial production. It is expected that commercial heap-leach cyanidation consumption for the mineralization types represented by the Long Canyon samples probably would not exceed 0.3 kg NaCN/t. The cement added during agglomeration (3.0 kg/t) was sufficient for maintaining protective alkalinity during leaching. No solution percolation, fines migration, or solution channeling problems were encountered during column leaching.

16.6 Gold Recovery Projections

Bottle roll and column-leach data are plotted to show gold recovery as a function of gold cyanide solubility % and particle size in Figure 16.5.

Figure 16.5 Overall Column-Leach Gold Recovery Using all Bottle Roll and Column-Leach Data



Using these data, straight-line (logarithmic) projections can be made for gold recovery, as a percent of gold cyanide solubility taken from the resource database, using any particle size selected. Gold recovery formulae were developed for each sample type and recoveries were calculated based upon three potential processing options:

1. Milling at a particle size P_{80} = 200 mesh (74 microns)
2. Crushed heap leaching at a particle size P_{80} = 2 inch (50,000 microns)
3. Run-of-Mine ("ROM") heap leaching at a particle size P_{80} = 6 inch (150,000 microns).

Gold recovery projections are presented in Table 16.6.

Table 16.6 Gold Recovery Projections as a Percent of Gold Cyanide Solubility

Sample #	Sample Description	P_{80} = 200 Mesh 74µ 72-hr leach (Au Recovery %)	P_{80} = -2 inch 50,000µ 69-day leach (Au Recovery %)	P_{80} = -6 inch 150,000µ 69-day leach (Au Recovery %)
#1	Cnpl(bx)	94.0	90	89
#2	Cnpl(bx)	96.4	95	94
#3	Cnpl	93.9	89	87
#4	Opl	88.1	82	80

Notes: 1 % soluble Au recovery loss assumed for 74 micron milling
2 % soluble Au recovery loss assumed for 50,000 micron crush/heap leach (LOM cycle)
3 % soluble Au recovery loss assumed for 150,000 ROM leaching (LOM cycle)

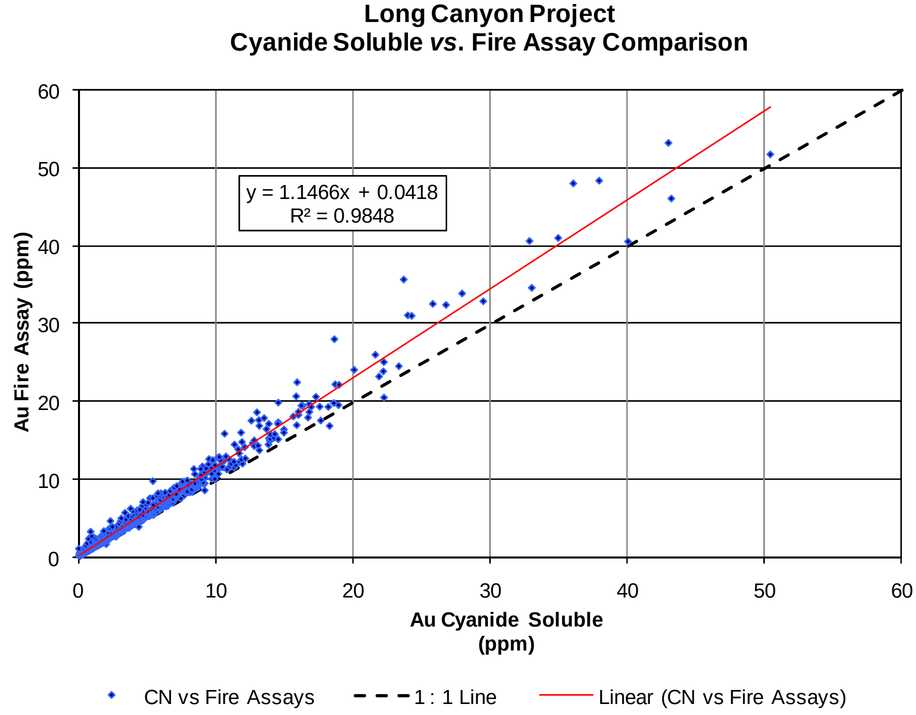
All known mineralization types are not represented by the four bulk samples taken by Fronteer, and therefore projecting recoveries into a larger resource tonnage and other potential types of mineralization than what is represented by the current test results should be considered at-risk until additional testing is completed. Due to the lack of data for all material types, a recovery of 88% for mineralization containing more than 1.25 g Au/t and 80% for material containing less than 1.25 g Au/t was recommended for use in the preliminary economic assessment. These recoveries are applied based on estimated fire-assay grades.

Gold recovery projections are planned to be updated in early 2010 upon completion of ongoing testing at McClelland on large-diameter core samples from deeper in the deposit.

16.7 Cyanide-Soluble vs. Fire Assays

Fire assay and cyanide-soluble gold analyses of a total of 1774 drill samples from holes drilled through 2008 are compared in Figure 16.6. The percent solubility implied by the data is calculated by dividing the cyanide soluble analysis by the fire assay of a sample, which is presumed to be the total gold content of the sample. Excluding one sample that was clearly misreported or is a sample mix-up, the mean and median of all cyanide-soluble/fire-assay ratios are 0.85 and 0.86, respectively; the mean lowers to 0.84 if the 34 samples with ratios greater than 1.00 are set to equal 1.00. These data indicate that an average of approximately 85% of the gold in the pulverized drill-sample pulps analyzed was extracted by the cyanide-soluble assay method.

Figure 16.6 Cyanide Soluble *vs.* Fire Assay Comparison



17.0 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

17.1 Introduction

Mineral Resources described in this report for the Long Canyon project have been estimated in accordance with standards adopted by the Canadian Institute of Mining, Metallurgy and Petroleum ("CIM") in August 2000, as amended, and prescribed by Canadian Securities Administrators' NI 43-101 ("NI 43-101"). The modeling and estimate of the Mineral Resources were done under the supervision of Michael M. Gustin, a qualified person with respect to Mineral Resource estimation under NI 43-101. Mr. Gustin is independent of Fronteer and AuEx by the definitions and criteria set forth in NI 43-101; there is no affiliation between Mr. Gustin and Fronteer and AuEx except that of an independent consultant/client relationship. There are no Mineral Reserves estimated for the Long Canyon project as of the date of this report.

Although MDA is not an expert with respect to any of the following aspects, MDA is not aware of any unusual environmental, permitting, legal, title, taxation, socio-economic, marketing, or political factors that may materially affect the Long Canyon Mineral Resources as of the date of this report.

The Mineral Resources presented in this report for the Long Canyon project conform to the definitions adopted by the Canadian Institute of Mining, Metallurgy and Petroleum ("CIM") in December 2000 and modified in 2005, and meet the criteria of those definitions, where:

> *A Mineral Resource is a concentration or occurrence of natural, solid, inorganic or fossilized organic material in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge.*
>
> *Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories. An Inferred Mineral Resource has a lower level of confidence than that applied to an Indicated Mineral Resource. An Indicated Mineral Resource has a higher level of confidence than an Inferred Mineral Resource but has a lower level of confidence than a Measured Mineral Resource.*
>
> *An 'Inferred Mineral Resource' is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques for locations such as outcrops, trenches, pits, workings and drill holes.*
>
> *Due to the uncertainty that may be attached to Inferred Mineral Resources, it cannot be assumed that all or any part of an Inferred Mineral Resource will be upgraded to an Indicated or Measured Mineral Resource as a result of continued exploration.*
>
> *An 'Indicated Mineral Resource' is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics, can be estimated with a level of confidence*

sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough for geological and grade continuity to be reasonably assumed.

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

17.2 Resource Modeling

17.2.1 Data

A model was created for estimating the gold resources at Long Canyon from data generated by Pittston, AuEx, and the Fronteer-AuEx Joint Venture through 2008, including geologic mapping, core and RC drill data, and project topography derived from 2007 IntraSearch, Inc. aerial photography and DEM data. These data were incorporated into a digital database using UTM NAD 83 Zone 11 coordinates expressed in metres, and all subsequent modeling of the Long Canyon resource was performed using Gemcom Surpac® mining software.

17.2.2 Deposit Geology Pertinent to Resource Modeling

The Long Canyon gold mineralization occurs primarily within silty and/or thinly bedded limestone units in the lowermost Pogonip Group and the uppermost Notch Peak limestone at their contacts with dolomite mega-boudins at the top of the Notch Peak Formation, especially along the noses of the boudins or within and adjacent to incipient, boudin-forming breaks in the dolomite. The contact of the limestone units between the mega-boudins (boudin neck areas, where the dolomite is absent) is also a favourable horizon for mineralization. Higher-grade gold mineralization occurs primarily within highly decalcified limestone and solution breccias that most commonly are associated with the noses of the boudins or the incipient boudin-forming breaks.

17.2.3 Geologic and Oxidation Modeling

Fronteer provided MDA with computer-generated three-dimensional solids of undifferentiated units lying in fault contact above the Pogonip Group, undifferentiated Pogonip Group, the dolomite unit within the uppermost Notch Peak Formation, and the remaining undifferentiated limestone of the Notch Peak Formation, as well as surfaces representing three fault structures. These solids and surfaces were defined using data from geologic logging of the drill holes as well as detailed surface mapping. During the process of mineral-domain modeling, MDA made minor modifications to the dolomite solid and the lower contact of the Pogonip solid to more precisely honor the logged geology in a handful of holes.

The entire drilled extent of the Long Canyon Mineral Resources is oxidized; only very local occurrences of partially oxidized pyrite have been noted in the drill samples. No explicit modeling of oxidation was therefore necessary.

17.2.4 Density

MDA examined the data derived from 231 dry bulk specific gravity ("SG") determinations completed on core samples submitted to AAL. Samples were taken from all types of mineralized rocks, including stratiform mineralization, breccias, jasperoids, and intrusions, as well as unmineralized limestone and dolomite above and below the mineralized zones. Samples were taken to ensure the general grade distribution within the deposit was properly represented. Twenty-three of the samples selected for SG determination consisted of pieces of half core at least 25 centimetres in length, while the remainder of the samples consisted of whole pieces of core at least 10 centimetres in length. AAL coated the samples with wax and determined the specific gravity by the water displacement method.

Descriptive statistics of the specific-gravity dataset were compiled for the major rock units, as well as by the gold mineral domains defined by MDA (discussed below). Following this analysis, MDA chose to assign unique specific-gravity values to each of the three mineral domains, as well as unmineralized Pogonip Group, the dolomite unit within the uppermost Notch Peak Formation, and the remaining undifferentiated Notch Peak Formation. These values are listed in the "Model SG" column of Table 17.1.

Table 17.1 Long Canyon Specific Gravity Data

Unmineralized Samples	SG Statisitics					Model SG
	Mean	Median	Min	Max	Count	
Pogonip Limestone	2.67	2.70	2.50	3.00	42	*2.70*
Notch Peak Dolomite	2.77	2.80	2.60	2.90	26	*2.75*
Notch Peak Limestone	2.68	2.70	2.40	2.90	35	*2.70*
Mineral Domains						
100	2.52	2.60	1.90	2.80	46	*2.55*
200	2.50	2.50	2.30	2.90	11	*2.50*
300	2.43	2.40	2.10	2.80	27	*2.40*

17.2.5 Gold Modeling

The Mineral Resources at Long Canyon were modeled and estimated by evaluating the drill data statistically, utilizing the lithologic solids and surfaces provided by Fronteer to interpret mineral domains on cross sections spaced at 50-metre intervals, rectifying the mineral domain interpretations on cross sections spaced at 10-metre intervals, analyzing the modeled mineralization geostatistically to establish estimation parameters, and estimating grades into a three-dimensional block model. All modeling of the Long Canyon resources was performed using Gemcom Surpac® mining software.

Mineral Domains. MDA modeled the Long Canyon gold mineralization by interpreting mineral-domain polygons on northeast-looking cross sections that span the extents of the deposit. A mineral domain is a natural grade population of a metal that occurs in a specific geologic environment. In order to define the mineral domains at Long Canyon, the natural populations were identified on quantile graphs that plot the gold-grade distributions of the drill-hole assays. This analysis led to the identification of low-, medium-, and high-grade gold populations. The gold grade populations consist of ~0.1 to ~2, ~2 to 4, and >~4 g Au/t (domain 100, 200 and 300, respectively). Ideally, each of these populations can be correlated with specific geologic characteristics that are captured in the project database to define the mineral domains.

At Long Canyon, the high-grade domain (domain 300) occurs primarily within hematitic, highly decalcified units and solution breccias developed in limestones of both the Pogonip Group and Notch Peak Formation along the dolomite contacts, typically around the nose of the mega-boudins or associated with incipient boudin-forming breaks. The higher-grade mineralization tends to have limited cross-sectional extents, on the order of a few metres to a few tens of metres, but can extend for hundreds of metres in northeasterly or northerly directions that have shallow plunges. Lesser amounts of the domain 300 mineralization occur within favourable stratigraphic horizons, especially the Pogonip /Notch Peak contacts in between the dolomite boudins. It is important to note that the solution breccias are often difficult to recognize in the RC drill chips, and therefore are largely defined by core drill holes and are inferred in many instances in the RC drill data. The solution-breccia geology is coupled with the high-grade gold population to define a mineral domain that is assigned a code of 300.

The medium-grade mineral domains (domain 200) typically envelope high-grade domain 300 mineralization. This domain includes less permeable portions of the solution breccia, where matrix-dominated breccia that often hosts higher-grade mineralization grades into crackle breccia along the walls of the karstic structures, and mineralization associated with less intensely decalcified limestone that is typical of domain 300. Lower-grade domain 100 occurs as disseminated mineralization within weakly developed breccias associated with the boudin noses and in the wall rock of the solution breccias. Domain 100 also pervades favourable stratigraphic horizons, particularly on all dolomite-boudin contacts, along the Pogonip/Notch Peak contact between the boudins, and within favourable limey horizons and possible structural zones within the upper Notch Peak Formation.

A total of 38 vertical N40˚E-looking cross sections spaced at 50-metre intervals across the deposit were used for the initial modeling of the Long Canyon mineral domains. The drill-hole traces, topographic profile, and slices of the Fronteer lithologic and structural solids were plotted on the sections, with gold assays (coloured by the grade domain population ranges defined above) and various geologic codes, including hematite percentage and breccias, plotted along the drill-hole traces. These data were used as the base for MDA's interpretations of the mineral domains. Mineral-domain envelopes were interpreted on these sections to more-or-less capture assays corresponding approximately to each of the defined grade populations in combination with available and reasonably assumed geologic criteria. Representative cross sections showing gold mineral-domain interpretations are shown in Figure 17.1 and Figure 17.2.

The 50-metre spaced sectional mineral-domain interpretations were used as control sections to create parallel intermediary sections at 10-metre intervals using Gemcom Surpac's morphing routine. The 10-metre spacing was chosen to match the block length along the northeast axis of the model. The morphing algorithm allows the user to select a mineral-domain polygon on one control section and explicitly correlate it with an associated polygon on an adjacent control section using control points. After sufficient control points correlating the two polygons are created, the software interpolates polygons at the specified distance, in this case 10 metres, which gradually morph from the shape of one control polygon to the shape of the adjacent control polygon. Each of the morphed polygons, as well as the control sections, where then modified as necessary to honor the assay and geologic data. The final product is a set of 10-metre spaced mineral-domain envelopes that three-dimensionally honor the drill data at the resolution of the block model.

Figure 17.1 Cross Section 11900 Showing Gold Mineral Domains

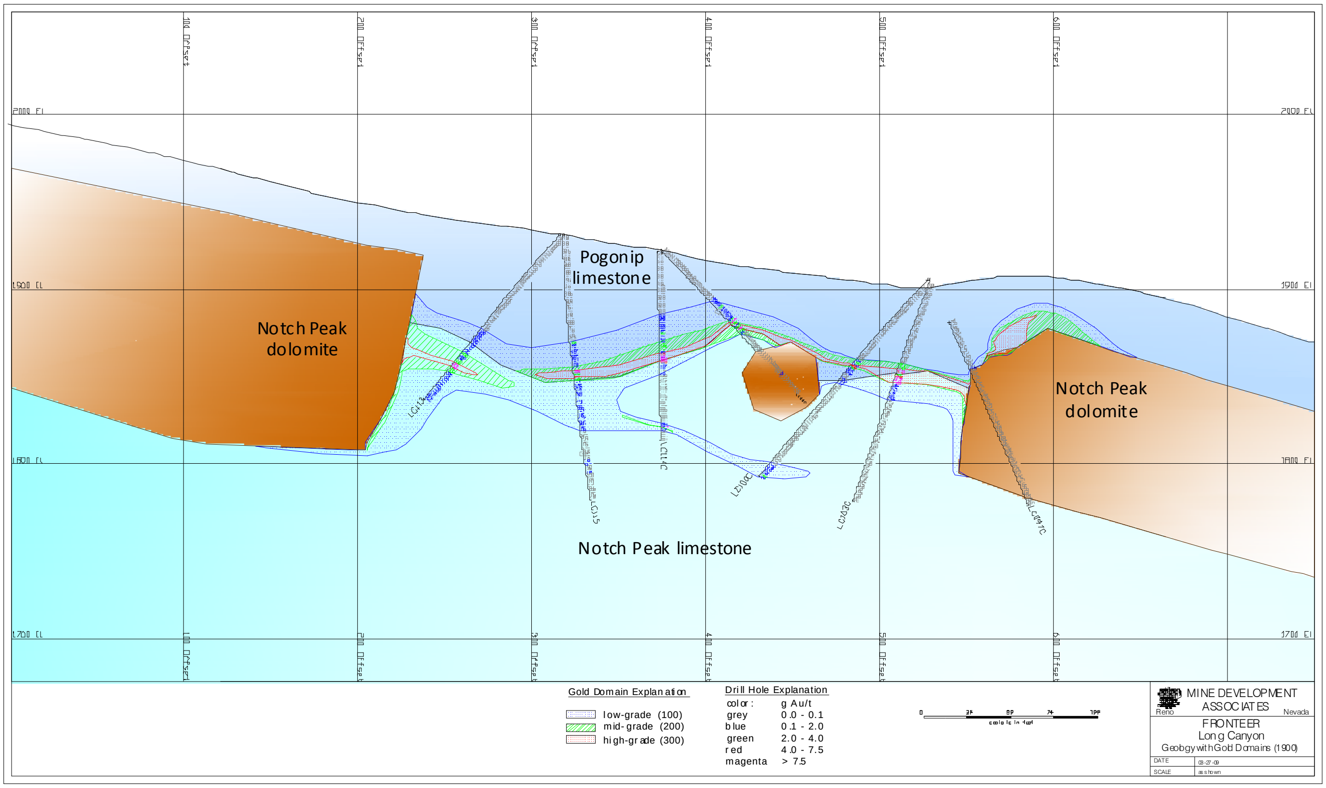
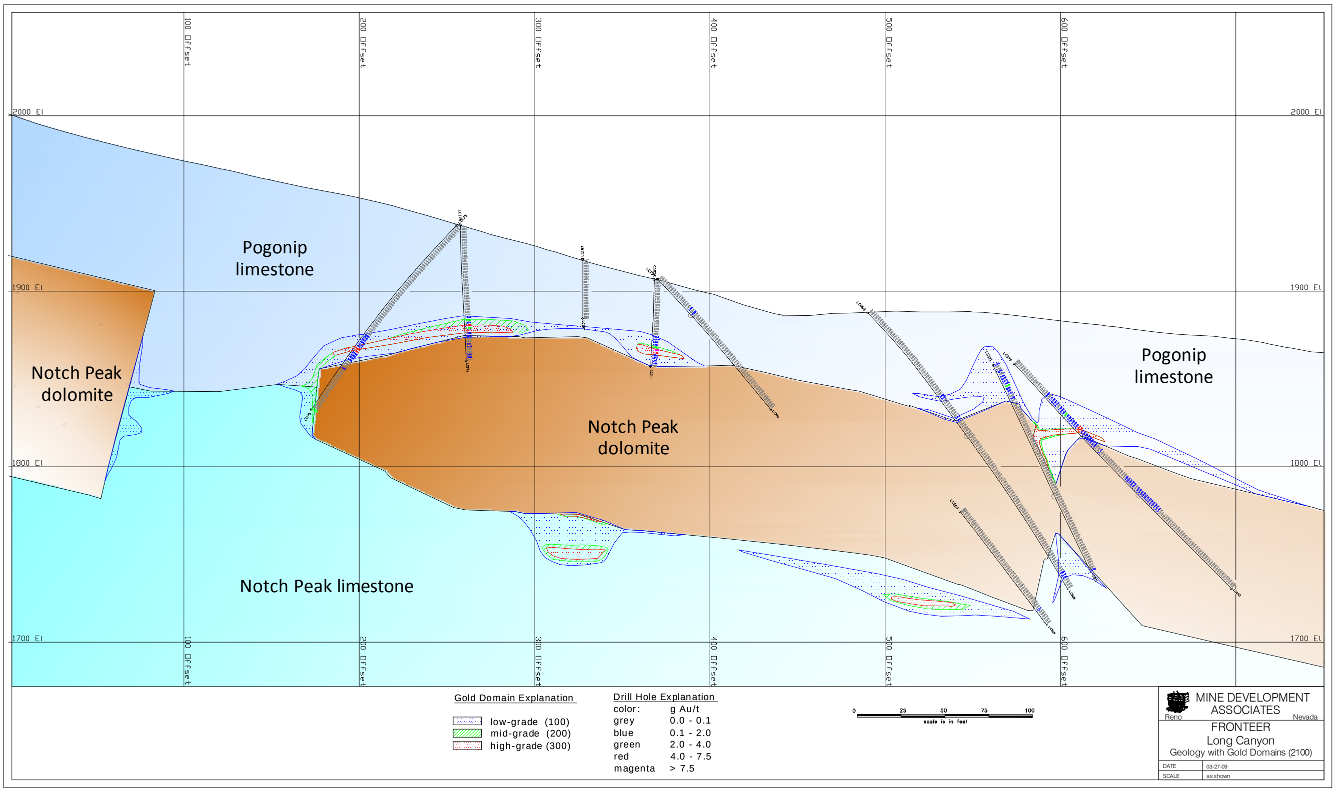


Figure 17.2 Cross Section 12100 Showing Gold Mineral Domains



Assay Coding, Capping, and Compositing. Drill-hole gold assays were coded to their domains by the sectional mineral-domain envelopes. Descriptive statistics of the coded assays are provided in Table 17.2.

Table 17.2 Descriptive Statistics of Coded Gold Assays

All Coded Long Canyon Au Assays

	Valid N	Median	Mean	Std. Dev.	CV	Min.	Max.	Units
From	2502					0.0	242.6	meters
To	2502					1.5	244.1	meters
Length	2502	1.52	1.45	0.25		0.28	2.13	meters
Au	2502	0.586	2.139	4.316	2.018	0.000	53.194	g Au/t
Au Cap	2502	0.586	2.126	4.234	1.991	0.000	45.000	g Au/t
Domain	2502					100	300	

Domain 100 Au Assays

	Valid N	Median	Mean	Std. Dev.	CV	Min.	Max.	Units
From	1779					0.0	242.6	meters
To	1779					1.5	244.1	meters
Length	1779	1.52	1.47	0.20		0.28	1.89	meters
Au	1779	0.310	0.529	0.596	1.127	0.000	10.050	g Au/t
Au Cap	1779	0.310	0.525	0.552	1.052	0.000	4.000	g Au/t
Domain	1779					100	100	

Domain 200 Au Assays

	Valid N	Median	Mean	Std. Dev.	CV	Min.	Max.	Units
From	344					0.0	242.3	meters
To	344					1.5	243.8	meters
Length	344	1.52	1.44	0.25		0.31	2.13	meters
Au	344	2.781	2.898	1.357	0.468	0.003	18.598	g Au/t
Au Cap	344	2.781	2.883	1.242	0.431	0.003	8.000	g Au/t
Domain	344					200	200	

Domain 300 Au Assays

	Valid N	Median	Mean	Std. Dev.	CV	Min.	Max.	Units
From	379					3.0	239.3	meters
To	379					4.6	240.8	meters
Length	379	1.52	1.34	0.36		0.30	1.98	meters
Au	379	7.722	9.700	7.636	0.787	0.136	53.194	g Au/t
Au Cap	379	7.722	9.650	7.386	0.765	0.136	45.000	g Au/t
Domain	379					300	300	

The process of determining assay caps began with inspection of quantile plots of the coded assays by domain to assess the mineral-domain populations and identify possible high-grade outliers that might be appropriate for capping. Descriptive statistics of the coded assays by domain and visual reviews of the spatial relationships of the possible outliers and their potential impacts during grade interpolation were also considered in the process of determining appropriate assay caps (Table 17.3). The effects of the assay capping can be qualitatively evaluated by examination of the descriptive statistics of the mineral-domain assays (Table 17.2).

Table 17.3 Long Canyon Gold Assay Caps

Domain	Capping Values	
	g Au/t	Number Capped (% of samples)
100	4.00	5 (<1%)
200	8.00	2 (<1%)
300	45.00	5 (~1%)

The assay caps for domains 100 and 300 are higher than might otherwise be the case since search restrictions of higher grade portions of these populations were applied in the grade interpolations (discussed below).

The capped assays were composited down-hole by domain. The composite length was initially chosen to match the block height of three metres, but while the mean grades of the composites by domain matched those of the coded assays, the median grade of the low-grade composites (domain 100) was significantly higher (+12%) than the coded assays. A composite length of 1.524 metres, which matches the modal sample length, was therefore used. Descriptive statistics of the composites are shown in Table 17.4.

Table 17.4 Descriptive Statistics of Long Canyon Gold Composites

All Long Canyon Au Composites

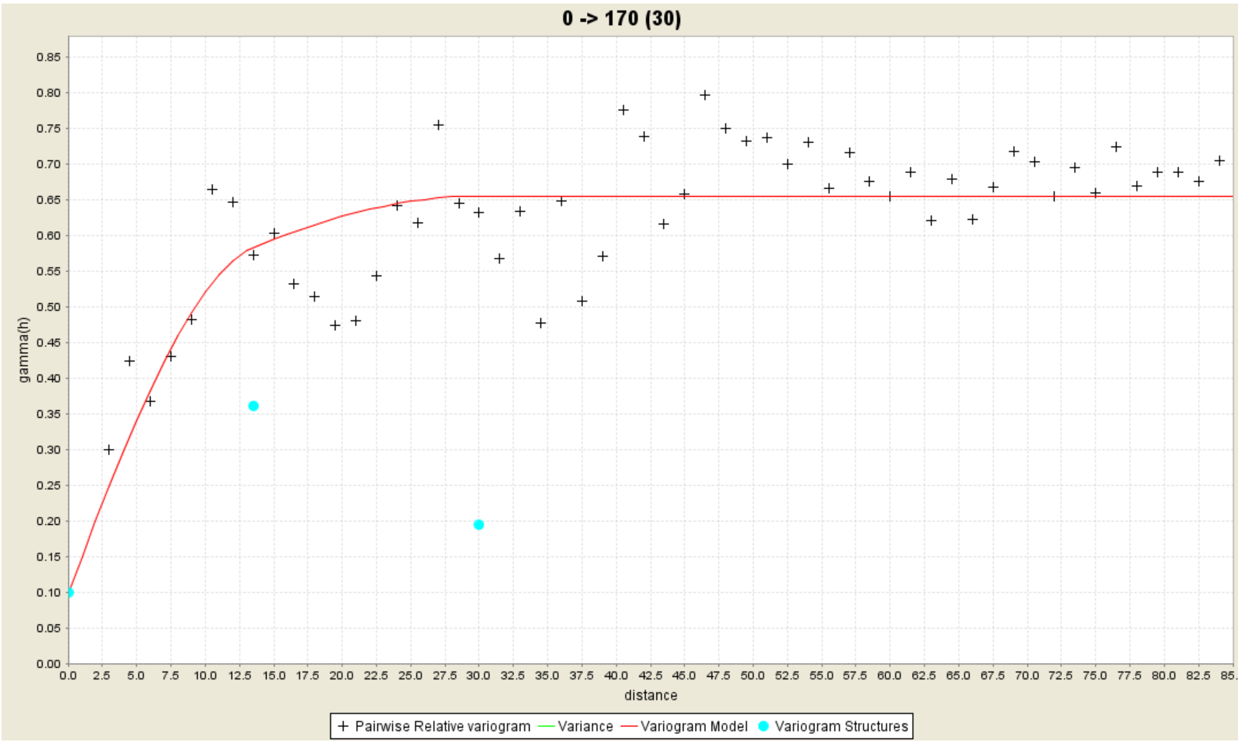
	Valid N	Median	Mean	Std. Dev.	CV	Min.	Max.	Units
From	2409					0.0	242.9	meters
To	2409					1.5	244.5	meters
Length	2409	1.52	1.50	0.13		0.46	1.52	meters
Au	2409	0.569	2.121	4.098	1.933	0.005	45.000	g Au/t
Domain	2409					100	300	

Block Model Coding. The 10-metre spaced sectional mineral-domain polygons were used to code a three-dimensional block model comprised of 5 metres (width) x 10 metres (length) x 3 metres (height) blocks. The model is rotated so that the “x” direction is parallel to the N40˚E-looking cross sections. In order for the block model to better reflect the irregularly shaped limits of the various gold domains, as well as to explicitly model dilution, the percentage volume of each mineral domain within each block is stored (the “partial percentages”).

The model is coded to specific gravity using the lithologic solids and the values listed in Table 17.1. The percentage of each block that lies below the topographic surface is also stored.

Grade Interpolation. A variographic study was performed using the gold composites from each mineral domain, collectively and separately, at various azimuths, dips, and lags. There are insufficient pairs to define reasonable structures for the domain 200 and 300 composites individually. Applying reasonable geologic orientations to the variography of domain 100 composites, domain 100 and 200 composites, and composites from all domains collectively yielded maximum ranges of 30 to 40 metres in the principle orientations of 350˚ (strike) and -10˚ at 080˚ (dip). The variogram in the strike direction for the combined domain 100 and 200 composites is shown in Figure 17.3. Parameters from the variography were used in the ordinary krige interpolation and provided information relevant to the estimation parameters used in the inverse-distance interpolation and resource classification.

Figure 17.3 Variogram at Strike Direction



While much of the Long Canyon mineralization plunges shallowly in a northeasterly direction, the Crevasse and Shadow Zones are approximately north-south oriented. These zones were therefore coded into the block model as a unique estimation domain.

MDA completed a number of gold interpolations, varying multiple parameters, in an attempt to optimize the Long Canyon model. Early in this process it was recognized that high-grade portions of the low- (domain 100) and high- (domain 300) grade populations were having excessive influence on the grade interpolations. This led to the use of search restrictions for the high-grade portions of these populations, concomitant changes to higher assay capping, and the use of inverse-distance interpolation (due to software limitations). The search-ellipse orientations and estimation parameters are presented in Table 17.5 and Table 17.6, respectively.

The major and semi-major axes of the search ellipses approximate the average strike and dip directions of the gold mineralization. The first-pass search distances take into consideration the results of both the variography and the multiple iterations of the interpolation to obtain optimal ranges. The second and third passes were designed to estimate grade into almost all blocks coded to the mineral domains that were not estimated in the first pass.

The estimation passes were performed independently for each of the mineral domains, so that only composites coded to a particular domain were used to estimate grade into blocks coded by that domain. The estimated grades were coupled with the partial percentages of the mineral domains and unmodeled waste stored in the blocks to enable the calculation of a single weight-averaged block-diluted grade for each block.

Table 17.5 Search Ellipse Orientations

Search Ellipse Orientations

Estimation Domain	Major Bearing	Major Plunge	Tilt
Main	035°	-10°	-10°
Crevasse	0°	-5°	-10°

Table 17.6 Summary of Long Canyon Estimation Parameters

Estimation Parameters: Au Domain 100, 200, 300

Estimation Pass	Search Ranges (m)			Comp Constraints				
	Major	Semi-Major	Minor	Min	Max	Max/hole	Min Holes	Search Restrictions
1	50	50	40	2	18	3	n/a	30m for domain300 >20g Au/t
2	100	100	40	2	18	3	n/a	30m for domain300 >20g Au/t 50m for domain100 >1g Au/t
3	175	175	70	1	18	3	n/a	30m for domain300 >20g Au/t 75m for domain100 >1g Au/t

Krige Parameters[1]

Estimation Domain	Model & Type	Orientation			Nugget	First Structure				Second Structure			
		Major Bearing	Major Plunge	Clockwise Tilt	c0	c1	Ranges (m)			c2	Ranges (m)		
All	SPH-Pairwise	80	0	-15	0.1000	0.3610	20	13.5	3.8	0.1940	40	30	11

[1] krige interpolation used as a check against the reported inverse-distance interpolation

17.2.6 Long Canyon Mineral Resources

The Long Canyon Mineral Resources are listed in Table 17.7 using a cutoff grade of 0.3 g Au/t. This cutoff was chosen to capture mineralization potentially available to open-pit extraction and heap-leach processing. The block-diluted resources are also tabulated at additional cutoffs in order to provide grade-distribution information, as well as to provide for economic conditions other than those envisioned by the 0.3 g Au/t cutoff.

Table 17.7 Long Canyon Mineral Resources

Long Canyon Indicated Resources			
Cutoff (g Au/t)	**Tonnes**	**g Au/t**	**oz Au**
0.10	6,508,000	1.79	374,000
0.20	5,565,000	2.07	369,000
0.30	***4,808,000***	***2.35***	***363,000***
0.50	3,691,000	2.94	349,000
1.00	2,496,000	4.01	322,000
1.50	1,975,000	4.75	302,000
3.00	1,272,000	6.19	253,000
5.00	743,000	7.84	187,000
10.00	107,000	12.96	45,000

Long Canyon Inferred Resources			
Cutoff (g Au/t)	**Tonnes**	**g Au/t**	**oz Au**
0.10	14,222,000	1.08	492,000
0.20	10,886,000	1.36	476,000
0.30	***8,780,000***	***1.63***	***459,000***
0.50	6,236,000	2.13	428,000
1.00	3,634,000	3.16	369,000
1.50	2,700,000	3.83	332,000
3.00	1,312,000	5.56	234,000
5.00	656,000	7.30	154,000
10.00	53,000	11.50	20,000

The Long Canyon resources are classified on the basis of the distance of the model blocks to the nearest composite and the minimum number of composites and drill holes used in the grade interpolation of each block. No Measured resources are assigned due to the preponderance of both geologic and assay data from reverse-circulation drill holes (see also Section 17.3). Two isotropic estimation passes were used to classify the resources (Table 17.8). All blocks that 'found' at least two composites within 15 metres (pass 1), or composites from two holes within 25 metres (pass 2) are classified as Indicated. All remaining blocks are classified as Inferred.

Table 17.8 Long Canyon Classification Parameters

Classification Passes

Classification	Pass	Search Ranges (m)			Comp Constraints			
		Major	**S-Major**	**Minor**	**Min**	**Max**	**Max/hole**	**Min Holes**
Indicated	1	15	15	15	2	2	2	n/a
	2	25	25	25	2	2	1	2
Inferred	All remaining blocks							

Figure 17.4 and Figure 17.4 show cross sections of the block model that correspond to the mineral-domain cross sections in Figure 17.1 and Figure 17.2, respectively.

Figure 17.4 Cross Section 11900 Showing Block Model Gold Grades

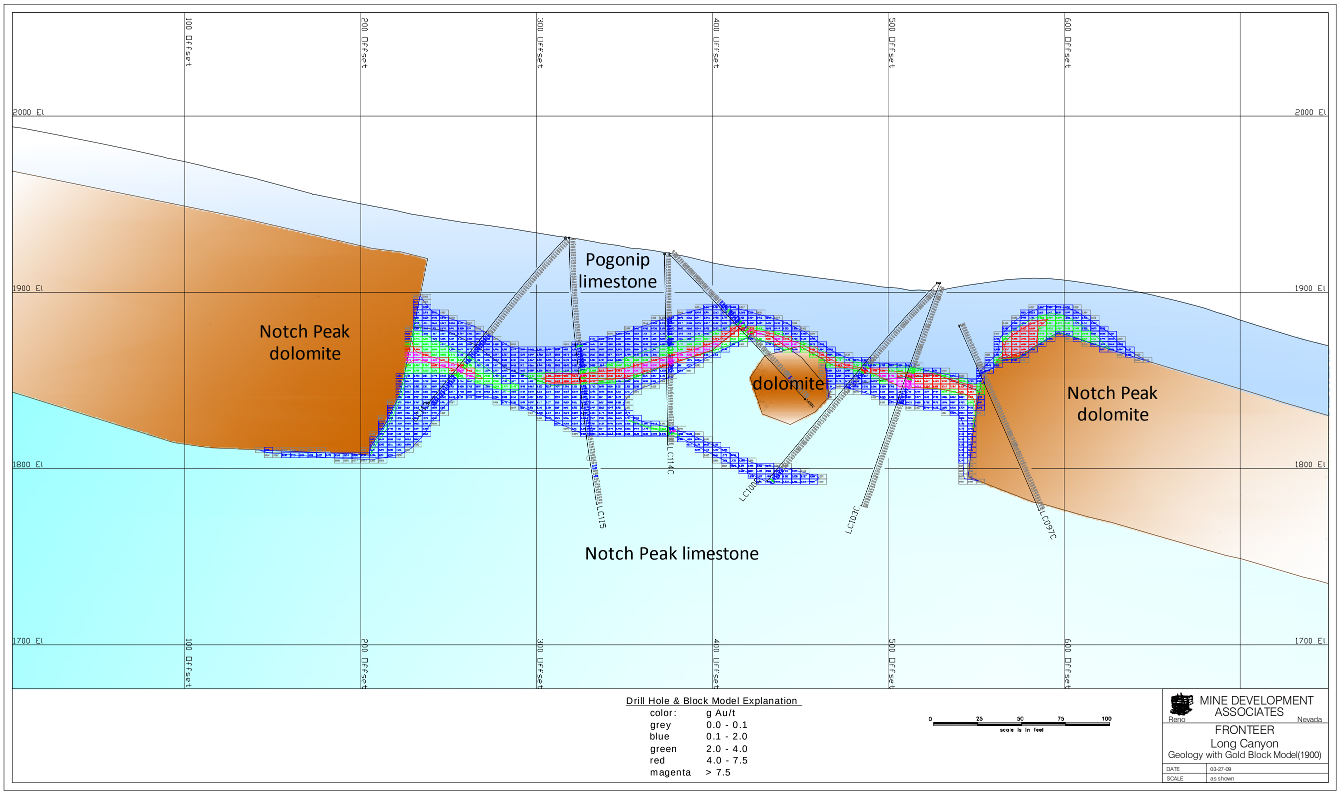
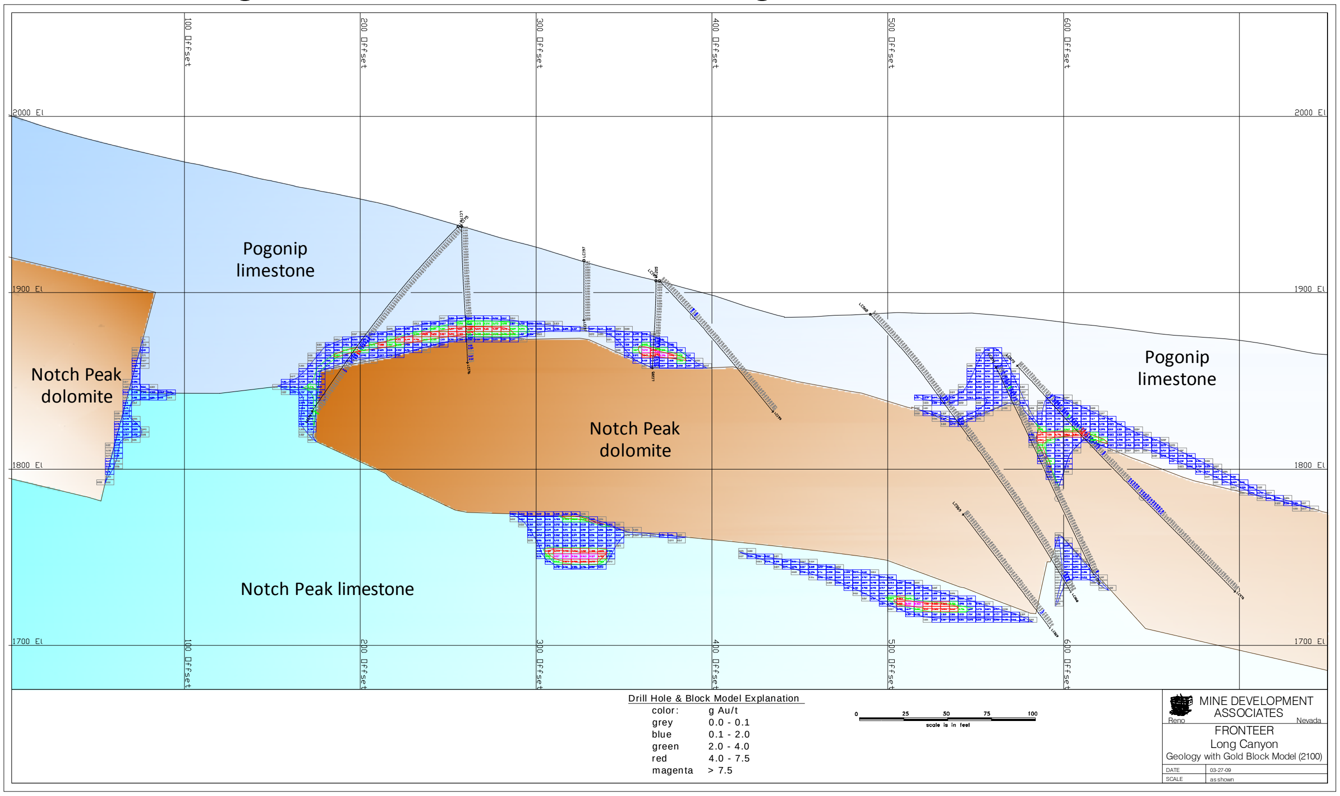


Figure 17.5 Cross Section 12100 Showing Block Model Gold Grades



17.3 Comments on the Resource Modeling

The block size used in the resource modeling has a relatively short vertical dimension (3m). MDA chose this block height so as not to overestimate dilution in the abundant, relatively thin, sub-horizontal mineralized zones that are common along the tops and bottoms of dolomite boudins. The block dimensions allow for re-blocking into blocks with a height of six metres if necessary for economic studies. It should be noted, however, that it is possible that the three-metre height used in the resource study could underestimate dilution, especially if ore/waste boundaries cannot be visually recognized during mining. High-grade mineralization at Long Canyon is typically associated with strong hematite, which should be easily distinguished from unmineralized material. Material close to a mining cutoff grade may not be as easily distinguished from waste, however.

The resources reported herein were estimated without the benefit of the results of surface sampling. Future resource studies should incorporate the surface sampling results to assist in defining the limits of the mineralization, although the actual surface assays should not be used in gold-grade interpolations.

As discussed in Section 12.3, down-hole contamination is an issue with some of the RC drill samples. The uncertainty imparted by the possible effects of contamination in the RC results is reflected in the absence of Measured resources. MDA strongly recommends that diamond-core drilling methods be used to complete all infill drilling at Long Canyon, with RC drilling used in the exploration and early-stage definition of new mineralized zones and extensions of known zones.

18.0 OTHER RELEVANT DATA AND INFORMATION

18.1 Introduction

MDA completed a preliminary economic assessment ("PEA") of the Long Canyon deposit. This PEA uses both Indicated and Inferred resources and applies pertinent economic parameters to evaluate the potential of the deposit to be mined as an open-pit operation.

Note that Canadian NI 43-101 guidelines define a PEA as follows:

> *A preliminary economic assessment is preliminary in nature and it includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied that would enable them to be classified as mineral reserves, and there is no certainty that the preliminary assessment will be realized.*

18.2 Pit Optimization

A pit optimization study was completed using Whittle™ software to determine the sensitivity to gold prices and to identify mineable shapes or pit phases to enhance the project value. This required input of parameters and analysis of the resulting pits. The pit optimization is an iterative process whereby parameters must be initially assumed, and once a preliminary mine plan has been completed, the parameters are updated with resulting costs.

18.2.1 Optimization Parameters

Final pit optimization parameters are provided in Table 18.1. Note that while the financial evaluation used a gold price or $800 per ounce, pit optimizations and cutoff grades used a gold price of $750 per ounce.

Table 18.1 Economic Parameters

Mining Cost	$1.60	$/t Mined
Leaching Cost	$2.12	$/t Processed
Refining Cost	$1.50	$/Rec Au Oz
Gold Recovery (Below 1.25 g Au/t)	80.0%	Oxide
Gold Recovery (Above 1.25 g Au/t)	88.0%	Oxide
G&A Cost	$2.11	$/t Processed
Gold Price	$ 750	$/oz
Breakeven Cutoff	0.30	g Au/t
Internal Cutoff	0.22	g Au/t

A breakeven cutoff grade of 0.30 g Au/t and an internal cutoff of 0.22 g Au/t were estimated based on the economic parameters. The breakeven cutoff is the point where revenue from processing of material at that grade is equal to the costs of mining, processing, and general and administration ("G&A"). The internal cutoff grade assumes that an ultimate pit has been pre-determined by an economic assessment, and that the mining cost is a sunk cost that is not used in the cutoff-grade calculation. The internal cutoff grade is the cutoff that is recommended for use during a mining operation once economic viability and the ultimate pit have been established.

An overall slope angle of 45° was assumed, though additional runs were made using slope angles from 40° to 50° in increments of 2.5° to gauge sensitivity.

The PEA assumes run-of-mine ("ROM") heap leaching is used for gold extraction. Leaching costs and recoveries were provided by Gary L. Simmons and are supported by metallurgical reports from McClelland.

Final PEA G&A costs during active mining are $2.33 per tonne processed. This compares with initial G&A costs of $2.11 per tonne processed used for pit optimization. Final PEA mining costs are $1.69 per tonne mined compared to initial estimates of $1.60 per tonne mined used for pit optimization. MDA considers the use of these initial costs for optimization work to be appropriate for this level of study.

Pit optimizations included Indicated and Inferred resources. Note that the current resource model does not define any Measured resources.

18.2.2 Pit Optimization Results

Whittle pit shells were developed using increasing gold prices from $150 per ounce to $1500 per ounce, in $25 per ounce increments. Pit optimization results are presented in Table 18.2, which shows tonnes and grades for selected pit shells from $150 to $1000 per ounce in increments of $50 per ounce.

Table 18.2 Pit Optimization Results

Au Price	Processed As Ore				Waste Tonnes	Total Tonnes	Strip Ratio
	K Tonnes	g Au/t	Kg	K Ozs			
$ 150	1,489	3.55	5,285	170	5,348	6,837	3.59
$ 200	2,548	3.09	7,867	253	9,968	12,516	3.91
$ 250	3,123	2.89	9,021	290	12,595	15,719	4.03
$ 300	4,850	2.91	14,103	453	31,186	36,036	6.43
$ 350	5,773	2.73	15,736	506	37,151	42,925	6.43
$ 400	6,296	2.64	16,622	534	41,101	47,398	6.53
$ 450	7,612	2.48	18,876	607	52,725	60,337	6.93
$ 500	7,971	2.42	19,268	619	54,567	62,538	6.85
$ 550	8,286	2.36	19,570	629	56,112	64,397	6.77
$ 600	8,537	2.33	19,865	639	58,058	66,596	6.80
$ 650	8,816	2.29	20,151	648	60,090	68,906	6.82
$ 700	9,561	2.20	21,014	676	67,231	76,792	7.03
$ 750	9,833	2.17	21,364	687	70,552	80,385	7.17
$ 800	10,109	2.14	21,627	695	73,029	83,138	7.22
$ 850	10,228	2.12	21,727	699	73,974	84,202	7.23
$ 900	10,410	2.10	21,897	704	75,846	86,257	7.29
$ 950	10,593	2.09	22,098	710	78,336	88,929	7.40
$ 1,000	10,740	2.07	22,209	714	79,615	90,355	7.41

18.3 Pit Design

Pit designs were developed using Whittle pits for guidance, while creating access for equipment and maintaining mineable bench widths. The ultimate pit volume is achieved in five phases. The primary considerations for an individual pit phase were based on Whittle pits at specific gold prices and the total tonnes of ore and waste that the pit provided. Additionally, pit phases considered separations in the mineable portions of the deposit created by the pit optimization. The optimization splits the deposit into three main volumes, in which the largest has been split into three separate phases (phases 1, 2, and 5).

Mineable Indicated and Inferred resources by pit phase are presented in Table 18.3 based on a 0.22 g Au/t cutoff grade.

Table 18.3 Mineable Resources (Indicated and Inferred Material Above Cutoff)

	Indicated			Inferred			Total			Waste	Total	Strip
Phase	K Tonnes	g Au/t	K Ozs Au	K Tonnes	g Au/t	K Ozs Au	K Tonnes	g Au/t	K Ozs Au	K Tonnes	K Tonnes	Ratio
Phase 1	1,820	2.85	167	1,730	2.16	120	3,550	2.51	287	20,568	24,118	5.79
Phase 2	435	2.00	28	951	1.60	49	1,386	1.73	77	13,774	15,160	9.94
Phase 3	888	1.89	54	1,318	1.18	50	2,206	1.47	104	9,121	11,327	4.13
Phase 4	517	3.43	57	1,031	2.81	93	1,548	3.01	150	30,754	32,302	19.87
Phase 5	227	1.64	12	492	1.33	21	719	1.43	33	7,128	7,847	9.91
Total	3,887	2.54	318	5,522	1.88	333	9,409	2.15	651	81,345	90,754	8.65

18.3.1 Design Parameters

Pit designs were created using MineSight® software. All designs were created using 45° overall slope angles. Ramps were designed with a 25-metre overall width and a maximum gradient of 10%.

18.3.2 Pit Phasing

Pit phases were designed to provide sufficient ore for leaching and exploitation of Whittle pit shells that optimize at lower gold prices in order to maximize the net present value of the project. Figure 18.1 through Figure 18.4 illustrate the pit designs for phases 1 through 4, respectively, and the ultimate pit is illustrated in Figure 18.5.

18.3.3 Comparison with Whittle Pits

Pit designs were created following Whittle pit optimizations. However, the process of creating access for equipment, smoothing walls, and limiting designs for minimum mining widths leads to designs containing less material to be processed and increased waste mining, which increases the strip ratio.

Table 18.4 gives a comparison of the $750 Au pit shell with the ultimate pit design. The process of designing the ultimate pit reduced the total material processed by 4% in tonnes and 5.2% in contained ounces. Waste tonnes were increased by 15.3%, and total tonnes were increased by 12.9%. MDA believes that this presents a conservative schedule for mining the resource, but that this is reasonable for the level of study. Future studies will require detailed geotechnical evaluations of slope parameters which can then be used in conjunction with anticipated ramp locations to better define slope parameters for pit optimizations and subsequent designs.

Table 18.4 Comparison of $750 Au Whittle Pit with Ultimate Pit Design

	Total Material Processed			Waste	Total	Strip
	K Tonnes	g/t Au	K Ozs Au	K Tonnes	K Tonnes	Ratio
750 Whittle Pit	9,833	2.17	687	70,552	80,385	7.17
Pit Resources	9,409	2.15	651	81,345	90,754	8.65
Difference	(424)	(0.02)	(36)	10,793	10,369	1.47
% Difference	-4.3%	-0.9%	-5.2%	15.3%	12.9%	20.5%

18.3.4 Joint Venture Inpit Resources

As part of the joint venture agreement between Fronteer and AuEx, each party retains a 3% NSR royalty on their respective lands contributed to the Joint Venture. MDA has estimated the percentage of inpit tonnes and contained ounces available to be processed for each of the joint venture partners based on the contributed land. The percentage of ownership is presented in Table 18.5 by resource category.

Table 18.5 Inpit Joint Venture 3% Royalty Ownership by Resource Class

	Indicated Above Cutoff		Inferred Above Cutoff		Total Above Cutoff	
	Tonnes	Ozs Au	Tonnes	Ozs Au	Tonnes	Ozs Au
Fronteer	75%	82%	77%	85%	76%	84%
Auex	25%	18%	23%	15%	24%	16%

Figure 18.1 Phase 1 Pit Design

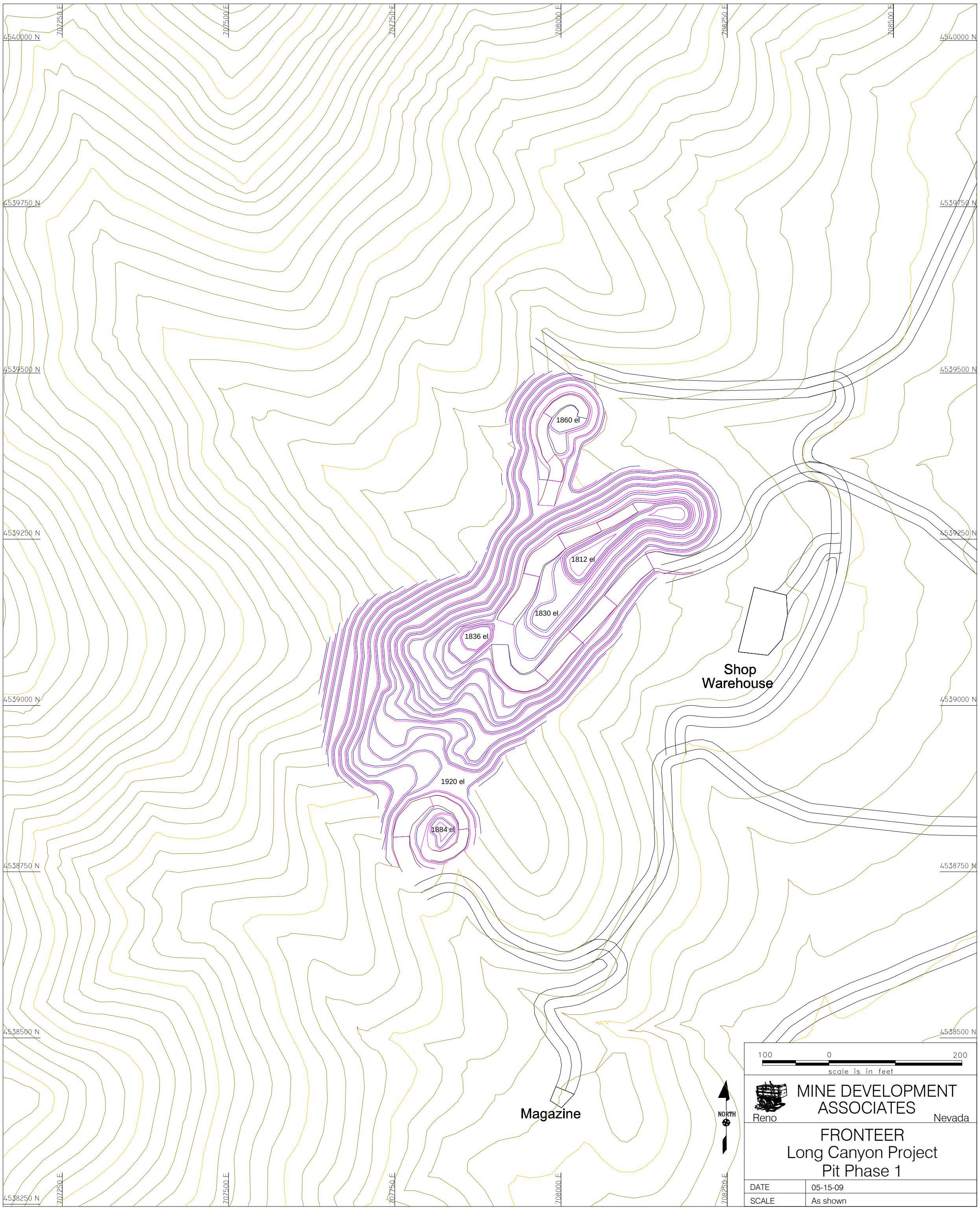


Figure 18.2 Phase 2 Pit Design

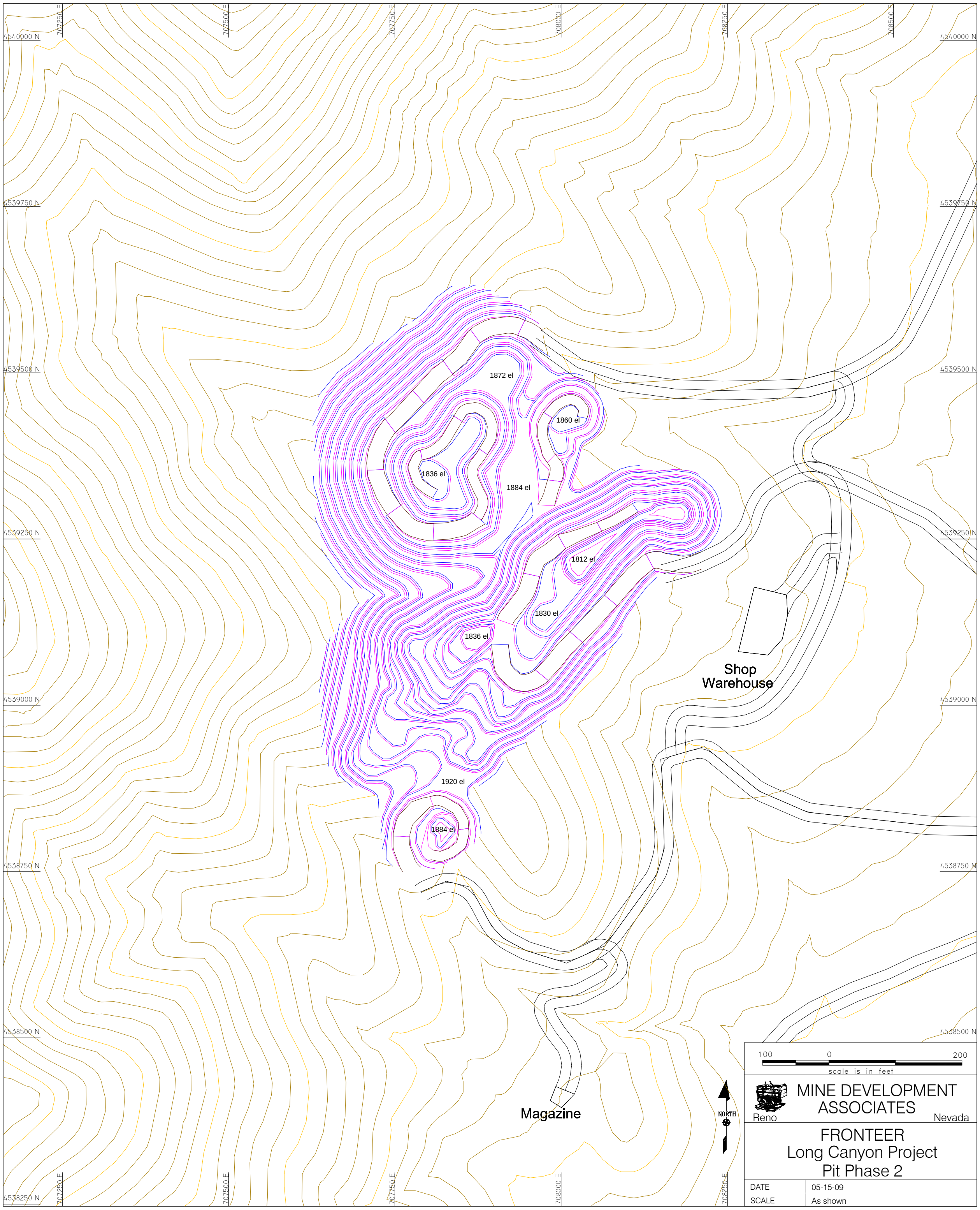


Figure 18.3 Phase 3 Pit Design

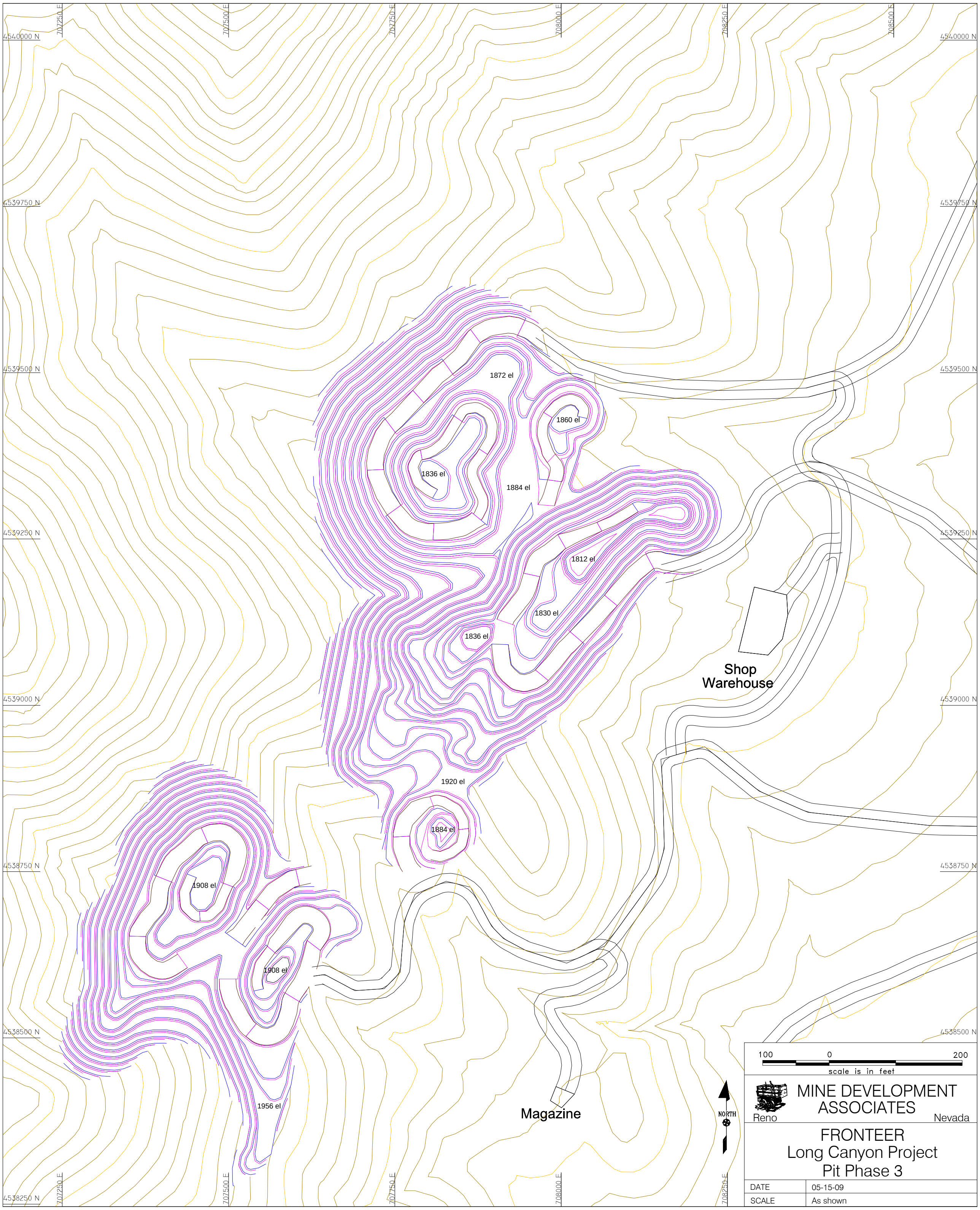


Figure 18.4 Phase 4 Pit Design

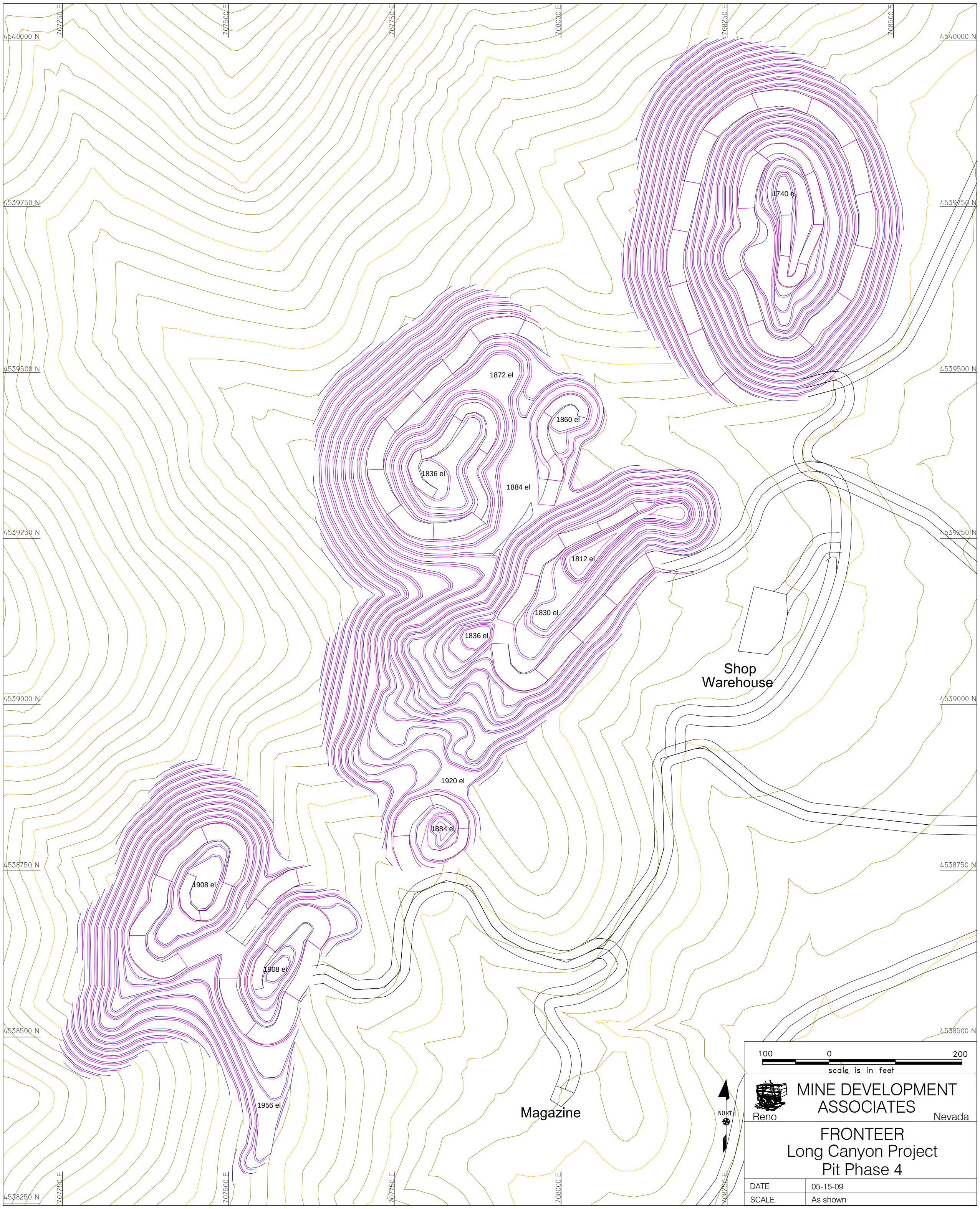
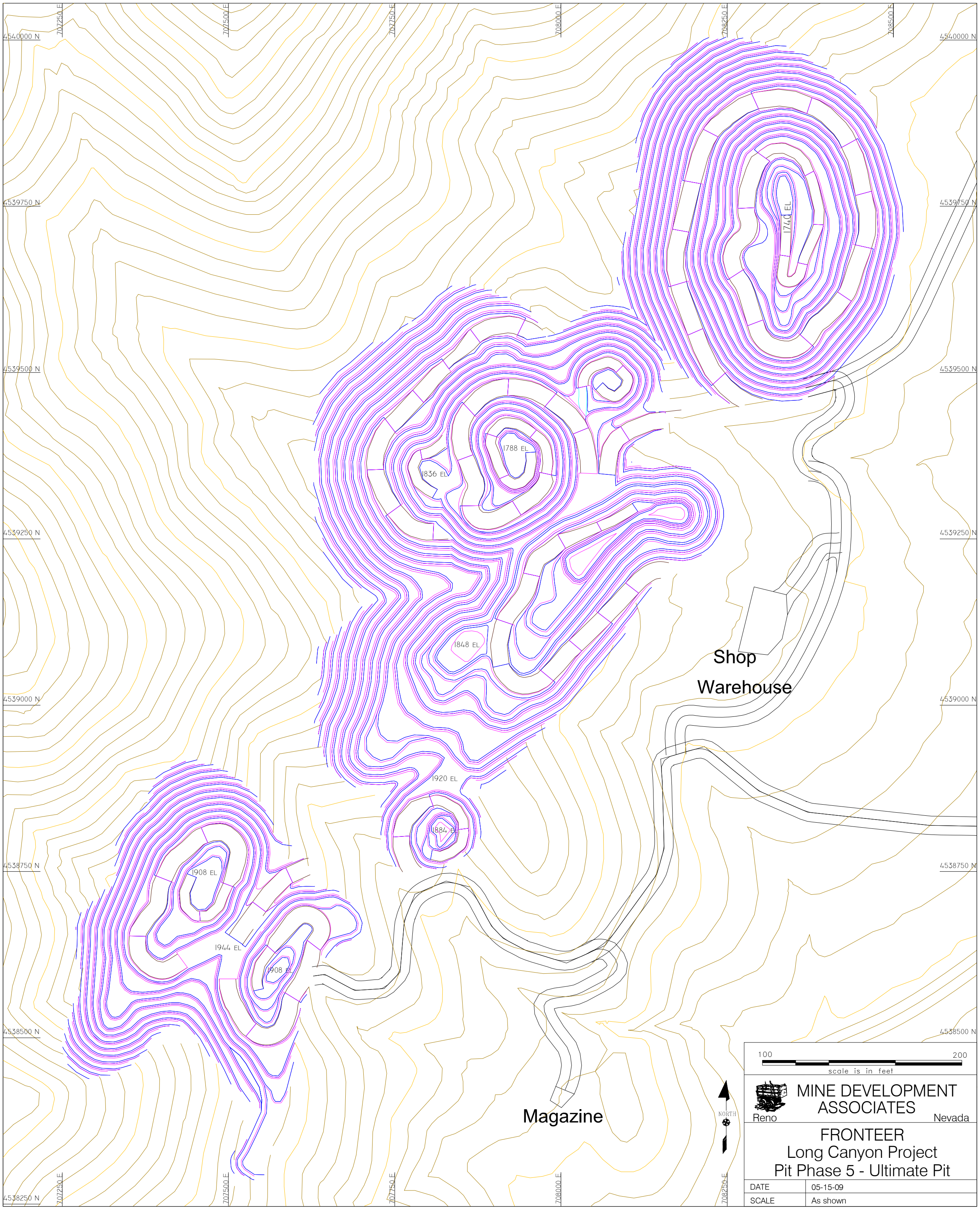


Figure 18.5 Phase 5 Ultimate Pit



18.3.5 Remaining Resources

The Indicated and Inferred resources remaining outside of the ultimate pit are shown in Table 18.6. MDA believes that there are not enough remaining resources for underground exploitation due to lack of tonnage and continuity in remaining grade zones, though this may warrant future study as additional resources are defined.

Table 18.6 Remaining Resources Beyond Pit Design

	Indicated			Inferred			Indicated & Inferred		
Cutoff (g Au/t)	K Tonnes	g Au/t	K oz Au	K Tonnes	g Au/t	K oz Au	K Tonnes	g Au/t	K oz Au
0.10	1,990	0.83	53	7,424	0.59	140	9,414	0.64	193
0.20	1,493	1.06	51	4,899	0.81	128	6,392	0.87	179
0.30	1,140	1.31	48	3,474	1.05	117	4,614	1.11	165
0.50	736	1.82	43	2,049	1.50	99	2,785	1.59	142
1.00	401	2.71	35	1,051	2.28	77	1,452	2.40	112
1.50	262	3.56	30	673	2.87	62	935	3.06	92
3.00	122	5.10	20	189	4.44	27	311	4.70	47
4.00	75	6.22	15	87	5.72	16	162	5.95	31
5.00	50	7.46	12	45	6.91	10	95	7.20	22
6.00	34	8.23	9	27	6.91	6	61	7.65	15
7.00	20	9.33	6	15	8.29	4	35	8.89	10
10.00	5	12.44	2	1	31.10	1	6	15.55	3

18.4 Production Schedule

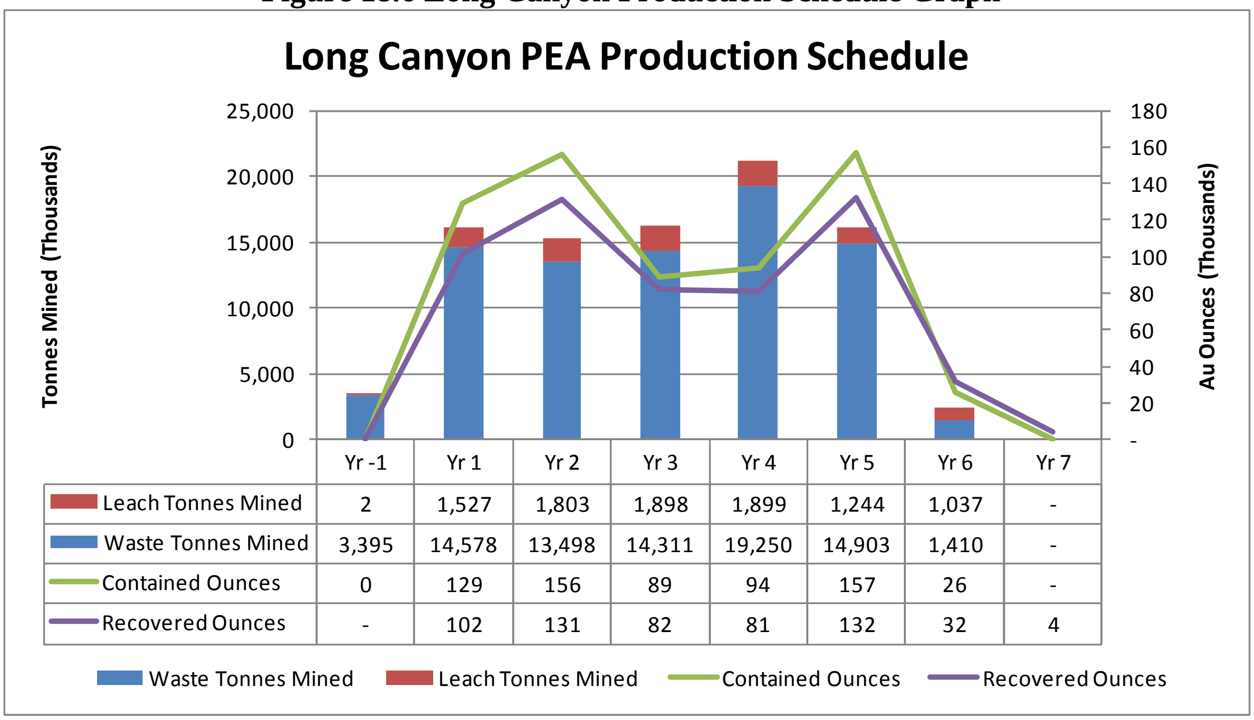
Mine and process production schedules were created to aid in the development of annual cash flows. Scheduling was done using Gemcom Surpac MineSched® software. The annual mining and ROM leach production is shown in Table 18.7 and illustrated in the graph of Figure 18.6.

Through the life-of-mine, an estimated 565,000 gold ounces are produced. Of this production, 474,000 gold ounces (84%) are produced from Fronteer claims. The remaining production of 90,000 gold ounces (16%) is attributed to AuEx claims. As part of the joint venture agreement between Fronteer and AuEx, each party retains a 3% NSR royalty on gold produced from their respective lands that were contributed to the Joint Venture.

Table 18.7 Long Canyon Production Schedule

Mined Material		Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Total
Leach Ore Mined	K Tonnes	2	1,527	1,803	1,898	1,899	1,244	1,037	-	-	-	9,409
Grade	g Au/t	0.29	2.64	2.69	1.46	1.53	3.93	0.78	-	-	-	2.15
Contained Gold	K Ozs	0	129	156	89	94	157	26	-	-	-	651
Waste	K Tonnes	3,395	14,578	13,498	14,311	19,250	14,903	1,410	-	-	-	81,345
Total	K Tonnes	3,397	16,104	15,301	16,209	21,149	16,147	2,447	-	-	-	90,754
Strip Ratio	W:O	1,803.55	9.55	7.49	7.54	10.14	11.98	1.36				8.65
ROM Heap Leach												
Leach Ore Processed	K Tonnes	2	1,527	1,803	1,898	1,899	1,244	1,037	-	-	-	9,409
Grade	g Au/t	0.29	2.64	2.69	1.46	1.53	3.93	0.78	-	-	-	2.15
Contained Gold	K Ozs	0	129	156	89	94	157	26	-	-	-	651
Ultimate Recovery	%	80.0%	87.2%	87.1%	85.8%	85.8%	87.9%	82.6%	0.0%	0.0%	0.0%	86.8%
Recoverable Ozs	K Ozs	0	113	136	76	80	138	22	-	-	-	565
Ozs Produced	K Ozs	-	102	131	82	81	132	32	4	0	-	565
Cumulative Recovery	%		78.5%	81.6%	84.1%	84.6%	84.5%	86.0%	86.7%	86.8%		

Figure 18.6 Long Canyon Production Schedule Graph



Mine and process production are further explained in the following sections.

18.4.1 Mine Production

Mine production was estimated using productivity parameters for hydraulic shovels and conventional mining haul trucks. Two hydraulic shovels are assumed with mechanical availabilities of 85% for each. The primary waste shovel assumed is a 16-cubic-metre hydraulic shovel with a maximum productive capacity of 1,930 tonnes per hour, or approximately 12.4 million tonnes per year based on a 360-day year. The primary ore shovel is a 12-cubic-metre hydraulic shovel with a maximum productive capacity of 1,090 tonnes per operating hour, or approximately 7 million tonnes per year based on a 360-day year. Both shovel productivities are estimated using 90-tonne haul trucks.

A peak requirement of 11 haul trucks is estimated for waste and ore haulage. The required number of trucks is based on haulage cycle times to the heap leach pad and waste dumps. All ore is sent to the single heap leach pad in the southern portion of the project area, while waste haulage is split between dumps in the north and south. Phases 1 through 3 waste material is assumed to be sent to the southern waste dump, while phase 4 and 5 material is sent to the north dump.

The waste dumps and leach pad are located approximately 2.0 kilometres and 2.8 kilometres from mining operations, respectively. The decision to locate leach pads and dumps further away from the mine is due to hydrologic sensitivities. While this decision has merit, a second production schedule was created to determine the cost savings associated with the shorter haulage distance and cycles. The second production schedule uses shorter cycle times to represent haulage to waste dumps that would be located closer to the mining areas. The resulting schedule reduces the total number of trucks required from 11 to nine and reduces the haulage cost by $0.16 per tonne of waste.

18.4.1.1 Process Production

Process production is modeled as a ROM heap leach operation. Material classified as ore would be hauled to a permanent leach pad and dumped in lifts of six metres. After stacking, the area is ripped using dozers to promote infiltration of fluids through the heap leach pad. Lime is added to each truck load of material prior to being dumped on the pad in order to maintain a proper pH balance. Piping is then laid on top of the lift, and a weak cyanide solution is sprayed or dripped on the pile, absorbing gold into the solution. This gold-bearing solution is collected and processed to recover gold that is then sold to a refinery.

Annual gold production was estimated based on ultimate recovery and lagged recovery factors to represent a more realistic schedule of gold production. The ultimate recoveries used are 88% for resources over 1.25 g Au/t and 80% for resources below 1.25 g Au/t. Recovery assumptions were provided by G. L. Simmons and are supported by a study completed by McClelland.

A lagging recovery is represented by the percentage of recoverable gold that is recovered on an annual basis. In the year material is placed on the pad, 90% of the recoverable gold is assumed to be recovered. During the second year after placement of material, an additional 8% of the recoverable gold is recovered, and during the third year the remaining 2% is recovered. This method accounts for the ultimate recovery, while spreading out gold production to better represent the leaching process.

Note that produced ounces are reduced in years 3 and 4 and then increase again in year 5. This is a function of mining phase 5, which has a higher-than-average strip ratio and higher grades later in the mine life.

18.5 Facilities

The following facilities were considered in the PEA analysis:

- Ultimate pit;
- Shop / warehouse;
- Explosives magazine;
- Office / safety building;
- North and south waste dumps; and
- Leach pad.

18.5.1 Heap Leach Pad

Preliminary designs were made for the single-use leach pad to be located in the southern portion of the project area. This facility will require additional geotechnical studies to ensure stability, as well as additional engineering and design to ensure optimal operation and solution flow. The current leach pad design incorporates a 36° inter-ramp angle as the angle of repose and catch benches that are placed to achieve an overall slope of 2.5 units horizontal for every vertical unit.

It is assumed that adequate space will be obtained near the leach pad for process facilities, which would include carbon columns and electrowinning circuits.

Capital and operating costs were provided by G. L. Simmons and are based on data provided by a cost-estimation service provider. The estimation considered the size of the proposed operation and scaled the costs accordingly. MDA reduced the total leach-pad expansion costs to reflect the resources processed for this PEA.

18.5.2 Mine Facilities

Two waste dumps were designed for permanent storage of mine waste material associated with mining of ore, with one located in the northern portion of the project area and one to south. These facilities will require additional geotechnical studies to ensure long-term stability. The current waste dump designs incorporate a 36° inter-ramp angle as the angle of repose and catch benches which are placed to achieve an overall slope of 2.5 units horizontal for every vertical unit.

18.5.3 Access Roads

The primary mine access road will be along the existing county road extending south from Oasis, Nevada. This intersects US Interstate 80 about 6.5 kilometres to the north of the mine. An estimated capital cost of $5.0 million is assumed for improvement of this road along with development of haul roads and other site work. This estimate was based on models provided by cost estimation services for similar operations.

18.5.4 Power

Capital cost estimates include building a 69 KV power transmission line from US Interstate 80 to the mine site. A total of $1.7 million is estimated for the construction of this power line.

18.6 Personnel

MDA estimated the workforce required for the Long Canyon operation based on the required equipment, tasks, and organizational structure for the mine. Personnel requirements were broken down into departments for General Administration, Mine Operations, Mine Maintenance, Engineering, Geology, and Process. Table 18.8 shows the personnel estimates for each of the departments on an annual basis. The maximum anticipated workforce will be about 197, not counting contractors, outside services, and corporate personnel.

Table 18.8 Personnel Estimate by Department

	Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9
General Administration	36	36	36	36	36	36	23	20	18	-
Mine Operations	98	113	113	113	112	112	112	-	-	-
Mine Maintenance	11	11	11	11	11	11	9	2	-	-
Engineering	7	7	7	7	7	7	7	-	-	-
Geology	5	5	5	5	5	5	5	-	-	-
Process	25	25	25	25	25	25	25	23	23	-
Total	182	197	197	197	196	196	181	45	41	-

18.7 Capital Cost Estimate

Initial project capital is estimated at $66.0 million, and the total sustaining annual capital through the life-of-mine is $6.0 million. An additional 8.9 million is included in year 1 for working capital, which is re-captured at the end of mine life. Estimates were made based on equipment and facility requirements. The capital estimates were provided by MDA, with the exception of process capital, which was provided by G. L. Simmons. The annual capital estimate is shown in Table 18.9. The following points summarize the capital investments:

- Mining Pre-strip:
  - $7.0 million – the total mining cost for year -1.
- Mining Equipment Capital:
  - $31.9 million initial capital (year -1 and year 1) and $0.6 million sustaining capital for primary and support mining equipment.
- Process Capital:
  - Initial capital is $8.9 million with $4.4 million in sustaining capital. The sustaining capital is for ongoing leach pad expansions. Mr. Simmons' original estimate for sustaining capital was $7.0 million for leach pad expansions, which anticipated a total of 15 million tonnes of material to be processed. However, after pit optimization, design, and application of appropriate cutoff grade, the tonnage was reduced to 9.4 million tonnes. MDA reduced the sustaining capital cost for pad expansions accordingly.

- Infrastructure & Buildings:
  - Initial capital estimate of $15.8 million includes $7.5 million for buildings and structures; $0.7 million for water, including wells; $1.7 million for power line construction to site; $5.0 million for construction of access roads, haul roads, and site work; $0.2 million for sewage collection and treatment; $0.5 million for fuel storage facilities; and $0.2 million for waste storage facilities. No sustaining capital is included.
- Miscellaneous:
  - $1.3 million in initial miscellaneous capital includes ambulance and fire equipment and light vehicles. MDA estimates a total of 35 light vehicles including trucks, flatbeds, and crew vans will be required based on personnel and specific job requirements. Sustaining capital of $1.0 million is required for light vehicles.
- Owners Cost:
  - Initial capital of $1.1 million covers the cost of pre-production operations. This includes G&A along with the mining, placement, and preparation of 2,000 tonnes of leach ore on pads during construction.
- Working Capital:
  - $8.9 million in year one estimated as 3 months of operating costs in year one. This is re-captured at the end of the mine life in year eight.

Table 18.9 Annual Capital Estimate

Initial Capital		Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Total
Mining Pre-strip	K US$	$ 7,031										$ 7,031
Mining Equipment	K US$	$ 26,358	$ 5,515									$ 31,873
Process	K US$	$ 8,880										$ 8,880
Infrastructure & Buildings	K US$	$ 15,847										$ 15,847
Miscellaneous	K US$	$ 1,337										$ 1,337
Owners Cost	K US$	$ 1,378										$ 1,378
Total Initial Capital	K US$	$ 60,832	$ 5,515	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 66,348
Sustaining Capital												
Mining	K US$			$ 468	$ 53	$ 34	$ -	$ -	$ -	$ -	$ -	$ 554
Process	K US$	$ -	$ 874	$ -	$ 2,040	$ 1,508	$ -	$ -	$ -	$ -	$ -	$ 4,422
Infrastructure & Buildings	K US$		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Miscellaneous	K US$		$ -	$ -	$ 661	$ 331	$ -	$ -	$ -	$ -	$ -	$ 993
Total Sustaining Capital	K US$	$ -	$ 874	$ 468	$ 2,754	$ 1,873	$ -	$ -	$ -	$ -	$ -	$ 5,969
Working Capital	K US$		$ 8,901	$ -	$ -	$ -	$ -	$ -	$ -	$ (8,901)	$ -	$ -
Total Capital	K US$	$ 60,832	$ 15,290	$ 468	$ 2,754	$ 1,873	$ -	$ -	$ -	$ (8,901)	$ -	$ 72,317

18.8 Operating Cost Estimate

18.8.1 Mining Cost Estimate

The mining cost was estimated using scheduled equipment costs, estimated parts consumption, mining-related workforce requirements, and estimates of supplies needed. The mining cost has been summarized into mining operations of drill, blast, load, haul, and mine support. Additional costs for mine maintenance and mine general services have also been estimated. These costs are shown in Table 18.10.

Mine maintenance includes maintenance supervision and general shop labor personnel, along with miscellaneous maintenance supplies. It does not include parts and labor for direct repair of mining equipment, as this cost is included in the individual mining operational costs (*i.e.*, drill, blast, load, haul, dump).

Mine general services includes costs for supervisor and clerical salaries, engineering department costs, and geology department costs.

In MDA's experience, the estimated mining cost is higher than other operations of this size. This is primarily caused by a higher cost for haulage due to the placement of waste dumps and leach pads at some distance from the pit. Placement of these facilities has been constrained by Fronteer management to ensure the hydrological integrity of springs in the area.

Table 18.10 Mining Cost Summary (000's $US)

Mine Cost Summary	Units	Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Total
Drill	K US$	$ 682	$ 2,954	$ 2,829	$ 2,962	$ 3,699	$ 2,966	$ 427	$ -	$ -	$ -	$ 16,518
Blast	K US$	$ 693	$ 3,178	$ 3,032	$ 3,197	$ 4,093	$ 3,185	$ 481	$ -	$ -	$ -	$ 17,859
Load	K US$	$ 587	$ 3,053	$ 2,964	$ 3,048	$ 3,566	$ 3,122	$ 370	$ -	$ -	$ -	$ 16,710
Haul	K US$	$ 2,947	$ 12,358	$ 12,203	$ 12,075	$ 11,208	$ 11,031	$ 1,539	$ -	$ -	$ -	$ 63,362
Mine Support	K US$	$ 1,199	$ 3,914	$ 3,914	$ 3,914	$ 3,919	$ 3,914	$ 557	$ -	$ -	$ -	$ 21,330
Mine Maintenance	K US$	$ 296	$ 987	$ 987	$ 987	$ 988	$ 987	$ 307	$ 214	$ -	$ -	$ 5,754
Mine General Services	K US$	$ 627	$ 2,288	$ 2,288	$ 2,288	$ 2,200	$ 2,199	$ 278	$ -	$ -	$ -	$ 12,168
Total	K US$	$ 7,031	$ 28,732	$ 28,217	$ 28,471	$ 29,672	$ 27,405	$ 3,958	$ 214	$ -	$ -	$ 153,701
Mine Cost per Tonne Mined												
Drill	US$/t	$ 0.20	$ 0.18	$ 0.18	$ 0.18	$ 0.17	$ 0.18	$ 0.17	$ -	$ -	$ -	$ 0.18
Blast	US$/t	$ 0.20	$ 0.20	$ 0.20	$ 0.20	$ 0.19	$ 0.20	$ 0.20	$ -	$ -	$ -	$ 0.20
Load	US$/t	$ 0.17	$ 0.19	$ 0.19	$ 0.19	$ 0.17	$ 0.19	$ 0.15	$ -	$ -	$ -	$ 0.18
Haul	US$/t	$ 0.87	$ 0.77	$ 0.80	$ 0.74	$ 0.53	$ 0.68	$ 0.63	$ -	$ -	$ -	$ 0.70
Mine Support	US$/t	$ 0.35	$ 0.24	$ 0.26	$ 0.24	$ 0.19	$ 0.24	$ 0.23	$ -	$ -	$ -	$ 0.24
Mine Maintenance	US$/t	$ 0.09	$ 0.06	$ 0.06	$ 0.06	$ 0.05	$ 0.06	$ 0.13	$ -	$ -	$ -	$ 0.06
Mine General Services	US$/t	$ 0.18	$ 0.14	$ 0.15	$ 0.14	$ 0.10	$ 0.14	$ 0.11	$ -	$ -	$ -	$ 0.13
Total	US$/t	$ 2.07	$ 1.78	$ 1.84	$ 1.76	$ 1.40	$ 1.70	$ 1.62	$ -	$ -	$ -	$ 1.69

Less Pre-stripping	K US$	$ 7,031
Net Life-of-Mine Cost	K US$	$ 146,669
Net Life-of-Mine Cost	US$/t	1.68

18.8.2 Process Operating Cost

The process cost per tonne was estimated by G. L. Simmons. These costs are based on leach cost models provided by an estimation service, which provides these costs by tonnage throughput rate. Mr. Simmons scaled the costs based on the relationship of the process cost to process tonnage rates. The resulting cost provided to MDA is $2.12/tonne of ore processed. MDA applied the process cost based on an assumed lag time for recovery of gold from the leach pad. This scheme applies 90% of the costs during the year placed, 8% of the cost in the year after placement, and 2% for the second year after placement. MDA believes this operating cost to be reasonable based on the ROM cost models.

18.8.3 General and Administrative Cost

MDA estimated the G&A costs based on an estimate of salaried and hourly workforce, assumed required supplies, and required outside services. Table 18.11 summarizes the G&A cost estimate.

Table 18.11 G&A Costs (000's $US)

General & Administration Costs	Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Total
Staff, Labor, & Burden	$ 738	$ 2,461	$ 2,461	$ 2,461	$ 2,461	$ 2,461	$ 1,757	$ 1,522	$ 271	$ -	$ 16,595
Accounting	$ 9	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 6	$ -	$ 225
Safety & Security	$ 9	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 6	$ -	$ 225
Environmental	$ 24	$ 80	$ 80	$ 80	$ 80	$ 80	$ 80	$ 80	$ 16	$ -	$ 600
Human Resources	$ 9	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 6	$ -	$ 225
Office Supplies & Postage	$ 15	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 10	$ -	$ 375
General Maintenance Supplies	$ 15	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 10	$ -	$ 375
Water Charges	$ 9	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 6	$ -	$ 225
Propane/Fuel	$ 24	$ 80	$ 80	$ 80	$ 80	$ 80	$ 80	$ 80	$ 16	$ -	$ 600
Communications	$ 15	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 10	$ -	$ 375
Small Vehicles (Admin Only)	$ 15	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 10	$ -	$ 375
Legal & Audit	$ 75	$ 75	$ 75	$ 75	$ 75	$ 75	$ 75	$ 75	$ 15	$ -	$ 615
Consultants	$ 24	$ 80	$ 80	$ 80	$ 80	$ 80	$ 80	$ 80	$ 16	$ -	$ 600
Community Relations	$ 30	$ 100	$ 100	$ 100	$ 100	$ 100	$ 100	$ 100	$ 20	$ -	$ 750
Janitorial Services/Supplies	$ 9	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 20	$ -	$ 239
Insurances	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 200	$ 50	$ 10	$ -	$ 1,460
Property Tax	$ 100	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 6	$ -	$ 316
Subs, Dues, PR, and Donations	$ 15	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 10	$ -	$ 375
Travel, Lodging, and Meals	$ 24	$ 80	$ 80	$ 80	$ 80	$ 80	$ 80	$ 80	$ 16	$ -	$ 600
Recruiting/Relocation	$ 15	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 10	$ -	$ 375
Total General & Administration	$ 1,374	$ 3,636	$ 3,636	$ 3,636	$ 3,636	$ 3,636	$ 2,932	$ 2,547	$ 490	$ -	$ 25,525
G&A Unit Costs per Tonne of Ore											
Salaries & Wages		$ 1.61	$ 1.37	$ 1.30	$ 1.30	$ 1.98	$ 1.69	$ -	$ -	$ -	$ 1.76
Supplies & Outside Services		$ 0.77	$ 0.65	$ 0.62	$ 0.62	$ 0.94	$ 1.13	$ -	$ -	$ -	$ 0.95
Total		$ 2.38	$ 2.02	$ 1.92	$ 1.92	$ 2.92	$ 2.83	$ -	$ -	$ -	$ 2.71
Average during Active Mining (Years 1 through 6)	$ 2.33										

18.8.4 Reclamation Cost

The reclamation cost has been estimated by using 50% of the process capital, or $6.7 million, through the life-of-mine. The total amount is spread out through the last three years of the operation. Although reclamation will require additional planning and studies, MDA considers the estimated cost to be reasonable for this level of study.

18.9 Cash Flow Analysis

MDA estimated pre-tax cash flows for the project and calculated the net present value ("NPV"), internal rate of return ("IRR"), and payback period for the cash flow. Total undiscounted pre-tax cash flow over the mine life is $181 million. The payback period is 1.3 years excluding the pre-strip period of approximately ½ year. The project NPV, using a 5% discount rate, is $145 million with an IRR of 64%. The cash flow is pre-tax, and as such does not include the Nevada Net Proceeds Tax ("NPT"). A rough calculation of the NPT is approximately $12.9 million through the life-of-mine using 5% of operating cash flow. Inclusion of the NPT would lower the IRR by about 5%. The pre-tax cash flow estimate is presented in Table 18.12.

Table 18.12 Long Canyon Project Cash Flow

		Yr -1	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Total
Mine Production												
Leach Ore Mined	K Tonnes	2	1,527	1,803	1,898	1,899	1,244	1,037	-	-	-	9,409
Grade	g Au/t	0.29	2.64	2.69	1.46	1.53	3.93	0.78	-	-	-	2.15
Contained Gold	K Ozs	0	129	156	89	94	157	26	-	-	-	651
Waste	K Tonnes	3,395	14,578	13,498	14,311	19,250	14,903	1,410	-	-	-	81,345
Total	K Tonnes	3,397	16,104	15,301	16,209	21,149	16,147	2,447	-	-	-	90,754
Strip Ratio	W:O	1,803.55	9.55	7.49	7.54	10.14	11.98	1.36				8.65
ROM Heap Leach												
Leach Ore Processed	K Tonnes	2	1,527	1,803	1,898	1,899	1,244	1,037	-	-	-	9,409
Grade	g Au/t	0.29	2.64	2.69	1.46	1.53	3.93	0.78	-	-	-	2.15
Contained Gold	K Ozs	0	129	156	89	94	157	26	-	-	-	651
Ounces Produced	K Ozs	-	102	131	82	81	132	32	4	0	-	565
Net Recovery	%	0.0%	78.5%	84.2%	91.9%	86.7%	84.2%	122.8%	0.0%	0.0%	0.0%	86.8%
Cumulative Recovery	%	0.0%	78.5%	81.6%	84.1%	84.6%	84.5%	86.0%	86.7%	86.8%		
Revenue												
Gold Price	$/oz Au	$ -	$ 800.00	$ 800.00	$ 800.00	$ 800.00	$ 800.00	$ 800.00	$ 800.00	$ 800.00	$ -	
Gross Revenue	K US$	$ -	$ 81,266	$ 104,903	$ 65,472	$ 64,823	$ 105,805	$ 25,666	$ 3,591	$ 345	$ -	$ 451,871
Operating Cost												
Mining	K US$		$ 28,732	$ 28,217	$ 28,471	$ 29,672	$ 27,405	$ 3,958	$ 133	$ -	$ -	$ 146,589
Process	K US$		$ 2,913	$ 3,699	$ 3,991	$ 4,021	$ 2,776	$ 2,271	$ 229	$ 44	$ -	$ 19,943
G&A	K US$		$ 3,636	$ 3,636	$ 3,636	$ 3,636	$ 3,636	$ 2,932	$ 2,547	$ 490	$ -	$ 24,151
Reclamation	K US$							$ 2,217	$ 2,217	$ 2,217		$ 6,651
Total	K US$	$ -	$ 35,281	$ 35,552	$ 36,099	$ 37,329	$ 33,817	$ 11,379	$ 5,127	$ 2,751	$ -	$ 197,334
Royalties & Refining Costs												
Refining Costs	Us$ / Oz	$ -	$ 152	$ 197	$ 123	$ 122	$ 198	$ 48	$ 7	$ 1	$ -	$ 847
Total Cash Cost	K US$	$ -	$ 35,433	$ 35,749	$ 36,222	$ 37,450	$ 34,015	$ 11,427	$ 5,133	$ 2,752	$ -	$ 198,181
Total Cash Cost	Us$ / Oz	$ -	$ 348.81	$ 272.62	$ 442.59	$ 462.19	$ 257.19	$ 356.17	$ 1,143.42	$ 6,373.65	$ -	$ 350.86
Operating Cash Flow	K US$	$ -	$ 45,832	$ 69,154	$ 29,250	$ 27,373	$ 71,789	$ 14,239	$ (1,542)	$ (2,406)	$ -	$ 253,690
Total Capital	K US$	$ 60,832	$ 15,290	$ 468	$ 2,754	$ 1,873	$ -	$ -	$ -	$ (8,901)	$ -	$ 72,317
Net Pre-Tax Cash Flow	K US$	$ (60,832)	$ 30,623	$ 68,686	$ 26,496	$ 25,499	$ 71,789	$ 14,239	$ (1,542)	$ 6,414	$ -	$ 181,373

Operating Cash Flow	K US$	$ 253,690
Net Pre-Tax Cash Flow	K US$	$ 181,373
NPV @ 5%	K US$	$ 144,619
NPV @ 8%	K US$	$ 126,583
NPV @ 10%	K US$	$ 115,910
NPV @ 15%	K US$	$ 93,099
IRR	%	64%
Payback	Yrs	1.30

18.9.1 Sensitivity Analysis

Using the cash flow estimate in Table 18.12, MDA analyzed the sensitivity of the deposit with respect to revenue, operating cost, and capital investment. This analysis uses the same pit designs and production schedule and substitutes values in the cash flow sheet for each of the sensitivities studied.

The results of this sensitivity are shown in Figure 18.7 and Figure 18.8 for the NPV (at 5%) and the IRR, respectively. Revenue, capital expenditures, and operating cost sensitivities are summarized in Table 18.13, Table 18.14, and Table 18.15, respectively. Both the NPV and the IRR are most sensitive to the change in revenue, which is most directly affected by change in gold price and recoveries. In comparison to revenue sensitivity, the deposit is less sensitive to change in operating cost and least sensitive to change in capital investment.

Figure 18.7 Long Canyon NPV 8% Sensitivities

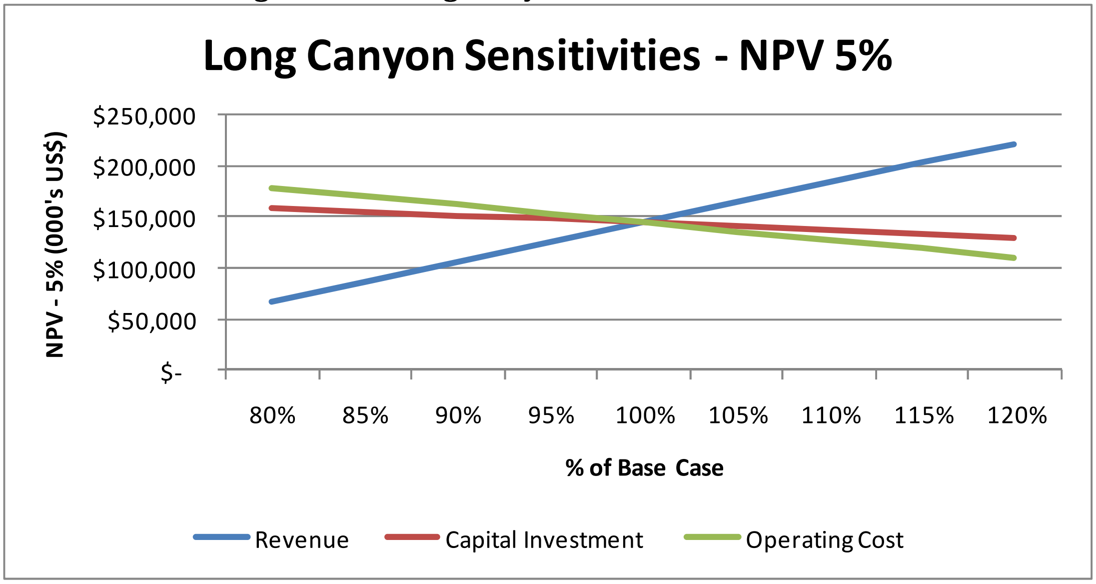


Figure 18.8 Long Canyon IRR Sensitivities

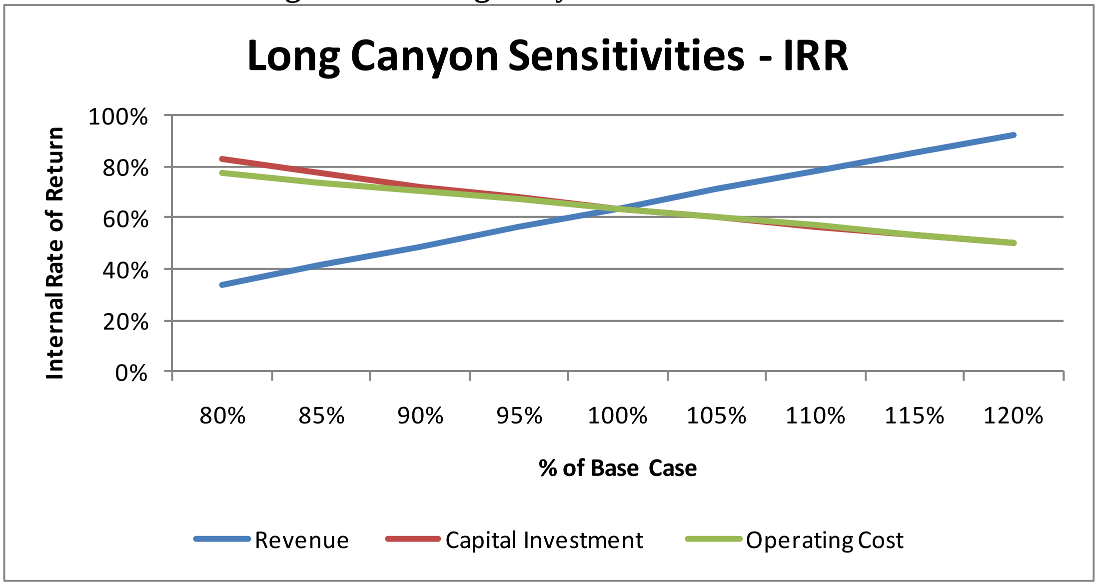


Table 18.13 Revenue Sensitivity (K US$)

	Operating Cash Flow	Pre-Tax Cash Flow	NPV 5%	NPV 8%	NPV 10%	IRR	Payback
80%	$ 163,316	$ 90,999	$ 67,165	$ 55,529	$ 48,664	34%	1.76
85%	$ 185,909	$ 113,592	$ 86,528	$ 73,293	$ 65,476	41%	1.61
90%	$ 208,503	$ 136,186	$ 105,892	$ 91,056	$ 82,287	49%	1.49
95%	$ 231,096	$ 158,779	$ 125,256	$ 108,820	$ 99,098	56%	1.38
100%	$ 253,690	$ 181,373	$ 144,619	$ 126,583	$ 115,910	64%	1.30
105%	$ 276,283	$ 203,967	$ 163,983	$ 144,347	$ 132,721	71%	1.22
110%	$ 298,877	$ 226,560	$ 183,347	$ 162,110	$ 149,533	78%	1.16
115%	$ 321,471	$ 249,154	$ 202,710	$ 179,874	$ 166,344	85%	1.10
120%	$ 344,064	$ 271,747	$ 222,074	$ 197,637	$ 183,155	92%	1.05

Table 18.14 Table Capital Expenditure Sensitivity (K US$)

	Operating Cash Flow	Pre-Tax Cash Flow	NPV 5%	NPV 8%	NPV 10%	IRR	Payback
80%	$ 253,690	$ 195,836	$ 158,872	$ 140,726	$ 129,985	83%	1.30
85%	$ 253,690	$ 192,220	$ 155,309	$ 137,190	$ 126,466	77%	1.30
90%	$ 253,690	$ 188,605	$ 151,746	$ 133,655	$ 122,947	72%	1.30
95%	$ 253,690	$ 184,989	$ 148,182	$ 130,119	$ 119,429	68%	1.30
100%	$ 253,690	$ 181,373	$ 144,619	$ 126,583	$ 115,910	64%	1.30
105%	$ 253,690	$ 177,757	$ 141,056	$ 123,048	$ 112,391	60%	1.30
110%	$ 253,690	$ 174,141	$ 137,493	$ 119,512	$ 108,872	57%	1.30
115%	$ 253,690	$ 170,525	$ 133,930	$ 115,976	$ 105,353	53%	1.30
120%	$ 253,690	$ 166,910	$ 130,367	$ 112,441	$ 101,834	50%	1.30

Table 18.15 Operating Cost Sensitivity (K US$)

	Operating Cash Flow	Pre-Tax Cash Flow	NPV 5%	NPV 8%	NPV 10%	IRR	Payback
80%	$ 293,157	$ 220,840	$ 178,752	$ 158,045	$ 145,772	77%	1.18
85%	$ 283,290	$ 210,973	$ 170,219	$ 150,179	$ 138,306	74%	1.20
90%	$ 273,423	$ 201,106	$ 161,686	$ 142,314	$ 130,841	70%	1.23
95%	$ 263,557	$ 191,240	$ 153,153	$ 134,449	$ 123,375	67%	1.26
100%	$ 253,690	$ 181,373	$ 144,619	$ 126,583	$ 115,910	64%	1.30
105%	$ 243,823	$ 171,506	$ 136,086	$ 118,718	$ 108,444	60%	1.33
110%	$ 233,957	$ 161,640	$ 127,553	$ 110,853	$ 100,979	57%	1.37
115%	$ 224,090	$ 151,773	$ 119,020	$ 102,987	$ 93,513	54%	1.40
120%	$ 214,223	$ 141,906	$ 110,486	$ 95,122	$ 86,047	50%	1.44

In addition to the sensitivity analysis above, Table 18.16 shows the economic results of the base case along with $700, $900, and $1000 per ounce gold prices.

Table 18.16 Economic Sensitivity at Upside Gold Prices

			Base Case		
		$700/Au Oz	$800/Au Oz	$900/Au Oz	$1000/Au Oz
Operating Cash Flow	K US$	$ 197,206	$ 253,690	$ 310,174	$ 366,658
Net Pre-Tax Cash Flow	K US$	$ 124,889	$ 181,373	$ 237,857	$ 294,341
NPV @ 5%	K US$	$ 96,210	$ 144,619	$ 193,028	$ 241,437
NPV @ 8%	K US$	$ 82,175	$ 126,583	$ 170,992	$ 215,401
NPV @ 10%	K US$	$ 73,881	$ 115,910	$ 157,938	$ 199,967
NPV @ 15%	K US$	$ 56,191	$ 93,099	$ 130,007	$ 166,915
IRR	%	45%	64%	82%	100%
Payback	Yrs	1.55	1.30	1.13	1.00

18.10 Conclusions and Recommendations

The Long Canyon deposit provides a good return on investment and should be pursued as an advanced exploration project. MDA recommends continuation of the project with a pre-feasibility study.

To complete a pre-feasibility study, more detail will need to be developed in areas of:

- Resources – Delineation and infill drilling will be required to increase the confidence of resource estimates. This will enable conversion of resources from Inferred to Measured and Indicated, which will in turn provide for a higher conversion rate of resources to reserves once a pre-feasibility study is completed.

- Geotechnical – Geotechnical studies need to provide slope parameters for pit designs to ensure safe and optimal pit walls. Additional drilling in areas where final highwalls will be located may be required.

- Processing – Ongoing metallurgical testing of materials representative of the deposit needs to be completed to confirm recoveries; preliminary metallurgical testing relied on near-surface samples.

- Permitting – Permitting efforts should continue, and a time frame should be developed with anticipation of putting the Long Canyon deposit into production. A plan of operations should be developed as part of the pre-feasibility study.

- Reclamation – Scheduling and costs for reclamation should be developed in greater detail.

19.0 INTERPRETATION AND CONCLUSIONS

MDA reviewed the project data and the Long Canyon drill-hole database, visited the project site, and obtained duplicate drill-hole samples for verification purposes. MDA believes that the data provided by Fronteer and AuEx, as well as the geological interpretations Fronteer has derived from the data, are generally an accurate and reasonable representation of the Long Canyon project.

Gold mineralization has been defined within a 1.7 kilometre-long northeast-trending area that is up to 400 metres wide and lies on a portion of the Long Canyon property. Mineralization is of the sediment-hosted gold type and is present in both surface outcrops and in exploration drill holes.

The primary structural/stratigraphic controls of the Long Canyon mineralization are related to the development of mega-boudins within the uppermost dolomite unit in the Notch Peak Formation. Gold occurs in limestones along the margins of the boudins (especially at and near the boudin noses) and within boudin necks. High-grade gold occurs within solution-collapse breccias and zones of strong decalcification within these structural/stratigraphic settings.

Long Canyon mineralization is generally characterized as being highly oxidized and non preg-robbing, with high cyanide solubility of gold. Results from the limited test data presently available on bulk surficial materials suggest that this mineralization is amenable to extraction of gold by cyanidation via oxide milling or heap leaching methods, although it is not known if the surficial samples are representative of the entire deposit. Testing of composites of large-diameter core from deeper portions of the deposit is scheduled for completion in early 2010.

Fronteer provided MDA with a project database consisting of information derived from 61 core holes and 170 RC holes completed by Pittston, AuEx, and the Fronteer-AuEx Joint Venture. MDA rebuilt the drill-hole assay portion of the database, and the Mineral Resources reported herein were estimated using this database.

An analysis of the QA/QC data collected during the AuEx and Joint Venture drilling programs did not identify any serious issues with the sample preparation and analyses of the drill samples. The drill data do indicate the presence of down-hole contamination in some portion of the RC sample database, however. This issue was mitigated to a large extent by removing suspect intervals from the resource modeling, but some uncertainty in the remaining RC data, in the form of unrecognized contamination, persists.

The Long Canyon resources are tabulated at a cutoff grade of 0.30 g Au/t to capture the oxidized mineralization potentially available for open-pit extraction. Indicated resources total 4.808 million tonnes averaging 2.35 g Au/t, with an additional 8.780 million tonnes averaging 1.63 g Au/t assigned to the Inferred category.

Results of a preliminary economic assessment indicate that Long Canyon is a deposit of merit and has the potential to yield a robust return on capital. The pre-tax internal rate of return is 64%, and the life-of-mine undiscounted cash flow is $181.3 million based on a $66.0 million initial investment. An annual average of 93,000 ounces of gold is produced through the operating life.

Drilling at Long Canyon was successful in outlining potentially economic gold mineralization in numerous drill holes. The limits of the gold mineralization are not fully delineated, however, and the deposit remains open along strike and at depth within the presently defined zones. There is also excellent potential for the discovery of new, parallel zones of mineralization related to dolomite boudins that have yet to be identified.

Rock chip and soil sample results have proven to be direct guides to the definition of shallow drill targets at Long Canyon. While many of the obvious targets have been drilled, several geochemical anomalies in favourable geologic settings remain to be tested. Definition of new targets will likely require the use of more sophisticated exploration methods. The known mineralized zones trend into areas of shallow cover that provide virtually no geochemical response in surface sampling. In these areas, subtle changes in the strike and dip of strata in the basal Pogonip Group can provide evidence of an underlying boudin neck. These indirect methods were successfully employed in the discovery of the Shadow and Crevasse Zones in 2008.

20.0 RECOMMENDATIONS

Significant, relatively shallow oxide Mineral Resources have been outlined at Long Canyon. These resources remain open, with substantial additions conceivable. Beyond the extensions of known zones of mineralization, there is excellent potential for the discovery of new mineralized zones. It is clear that the Long Canyon project warrants significant additional expenditures.

Further drilling at Long Canyon should focus on three objectives: (i) the expansion of resources by drilling open-ended extensions of the four mineralized zones; (ii) the identification of additional zones of mineralization within new structural/stratigraphic settings; and (iii) the upgrading of the resource classification through infill drilling.

MDA strongly recommends that diamond-core drilling methods be used to complete all infill drilling at Long Canyon. Core drilling provides higher-quality samples that will allow for the definition of Measured resources. RC drilling should be confined to the testing of new exploration targets, as well as the initial testing of the extensions of presently defined zones of mineralization. The geologic model should continue to be refined as new drill data are received.

Significant exploration drilling is justified. While several areas beyond the limits of Long Canyon deposit have already been outlined for drill testing, additional detailed geologic mapping, systematic sampling of road cuts along new access roads, extensions of the existing soil grid, and geophysical surveys should be used to identify new targets.

Environmental work, including the characterization of waste, is also warranted. Hydrologic investigations are needed for general project permitting purposes as well as to identify supplemental community water sources. The hydrologic program will need to include the drilling of a number of holes, as may be recommended by qualified experts.

The Fronteer-AuEx Joint Venture approved a 2009 exploration program with a budget of US$14,850,000 program for Long Canyon. The budget includes 19,000 metres of core drilling and 28,000 metres of RC drilling, as well as a continuation of the ongoing geological mapping program, further rock, soil and road cut sampling, continued efforts pursuant to refining the Long Canyon geological model and geological controls on mineralization, and the initiation of various engineering, metallurgical, and environmental investigations. MDA believes that Long Canyon is a project of merit that warrants this level of expenditures.

Upon completion of the 2009 program at Long Canyon, MDA recommends that the mineral resources be updated and used as the basis for a pre-feasibility study. The pre-feasibility study would require additional data in the following areas:

- Geotechnical – Slope parameters for pit designs are needed to ensure safe and optimal pit walls. This study may require additional drilling in areas where final pit highwalls will be located.
- Processing – Additional metallurgical data are needed to confirm gold recoveries.
- Permitting – Parameters and time frame of a plan of operations for a mining project will need to be developed as part of the pre-feasibility study.

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22.0 DATE AND SIGNATURE PAGE

Effective Date of report: August 28th, 2009

Completion Date of report: December 11, 2009

"Michael M. Gustin" December 11, 2009

Michael M. Gustin, P. Geo. Date Signed

December 11, 2009

Moira Smith, P. Geo. Date Signed

"Thomas L. Dyer"

December 11, 2009

Thomas L. Dyer, PE Date Signed

"Gary L. Simmons" December 11, 2009

Gary L. Simmons, PE Date Signed

23.0 CERTIFICATE OF AUTHORS

MICHAEL M. GUSTIN, P.GEO.

I, Michael M. Gustin, P. Geo., do hereby certify that I am currently employed as Senior Geologist by Mine Development Associates, Inc., 210 South Rock Blvd., Reno, Nevada 89502 and:

1. I graduated with a Bachelor of Science degree in Geology from Northeastern University in 1979 and a Doctor of Philosophy degree in Economic Geology from the University of Arizona in 1990. I have worked as a geologist in the mining industry for more than 25 years. I am a Licensed Professional Geologist in the state of Utah (#5541396-2250), a Licensed Geologist in the state of Washington (# 2297), and a member of the Society of Mining Engineers and the Geological Society of Nevada.
2. 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 Fronteer Development Group Inc. and AuEx Ventures, Inc., and all of each of their subsidiaries, as defined in Section 1.4 of NI 43-101 and in Section 3.5 of the Companion Policy to NI 43-101.
3. I visited the Long Canyon project site most recently on July 15, 2008.
4. I am responsible, or have co-responsibility, for all Sections except Sections 16.0 (Mineral Processing and Metallurgical Testing) and 18.0 (Other Relevant Data and Information) in this report titled, "***Updated Technical Report on the Preliminary Economic Assessment of the Long Canyon Project, Elko County, Nevada***", dated December 11, 2009 (the "Technical Report"), subject to my reliance on other experts identified in Section 3.0.
5. I have had no prior involvement with the property or project that is the subject of the Technical Report.
6. As of the date of the certificate, to the best of my knowledge, information, and belief, this Technical Report contains all the scientific and technical information that is required to be disclosed to make this technical report not misleading.
7. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
8. The Technical Report contains information relating to mineral titles, permitting, environmental issues, regulatory matters, and legal agreements. I am not a legal, environmental or regulatory professional, and do not offer a professional opinion regarding these issues.
9. A copy of this report is submitted as a computer readable file in Adobe Acrobat© PDF© format. The requirements of electronic filing necessitate submitting the report as an unlocked, editable file. I accept no responsibility for any changes made to the file after it leaves my control.

Dated December 11, 2009

"Michael M. Gustin"

Michael M. Gustin

Thomas Dyer, P. E.

I, Thomas Dyer, P. E., do hereby certify that I am currently employed as Senior Engineer by Mine Development Associates, Inc., 210 South Rock Blvd., Reno, Nevada 89502 and:

1. I graduated with a Bachelors of Science degree in Mine Engineering from South Dakota School of Mines & Technology in 1996. I have worked as a Mining Engineer for 13 years since graduation.

2. I am a registered as a Professional Engineer – Mining in the State of Nevada (# 15729). I am also a Registered Member of SME (# 4029995RM) in good standing.

3. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101. I am independent of the issuer applying all of the tests in section 1.5 of National Instrument 43-101.

4. I am responsible for the preparation of the Preliminary Economic Assessment provided in Section (18.0) of this report titled Updated Technical Report on the Preliminary Assessment of the Long Canyon Project Elko County, Nevada, USA and dated December 11, 2009 (the "Technical Report"). I have not visited the site.

5. I have had no prior involvement with the property.

6. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which makes the Technical Report misleading.

7. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

8. I consent to the filing of the Technical Report with any securities regulatory authority, stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated this 11th day of December 2009.

"Thomas L. Dyer"

Thomas Dyer

MOIRA T. SMITH

I, **Moira T. Smith**, P. Geo., do hereby certify that:

1) I am a geologist residing at 928 Hardrock Place, Spring Creek, NV 89815, and employed by Fronteer Development USA, Inc., as Senior Geoscientist.

2) I am a graduate of Pomona College, with a B.A in Geology in 1983. I obtained a M.Sc. in Geology from Western Washington University in 1986, and a Ph.D. in Geology from University of Arizona in 1990. I have practiced my profession continuously since 1990.

3) I am a Professional Geoscientist registered in good standing with the Association of Professional Engineers and Geoscientists of British Columbia (#122720);

4) I have worked on the property continuously since May 15th, 2008 and have relevant experience having led or participated in geological studies supporting 6 advanced exploration and development projects and/or operations, in 4 different countries.

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 professional associations (as deemed in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" (QP) for the purposes of NI 43-101.

6) I was responsible for the preparation of Sections 4 - 10 of the report entitled "***Updated Technical Report on the Preliminary Economic Assessment of the Long Canyon Project, Elko County, Nevada***", dated December 11, 2009, (the "Technical Report") relating to the Long Canyon Property. I have worked on the property in a technical capacity since May 15, 2008 and personally visited the site most recently in April 2009.

7) As of November 16th, 2009, and 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 and I have read the disclosure being filed and it fairly and accurately represents the information in the Technical Report that supports the disclosure.

8) I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in the Technical Report, the omission to disclose which make the Technical Report misleading.

9) I am not independent of the issuer applying all the tests in Section 1.5 of NI 43-101 and acknowledge that I hold securities of Fronteer Development Group, Inc. in the form of stock and stock options.

10) I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

11) I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated this 11th day of December 2009 in Elko, Nevada

Moira Smith

Moira Smith
Senior Geoscientist
Fronteer Development USA, Inc.

GARY L. SIMMONS, METALLURGICAL ENGINEER

I, Gary L. Simmons, do hereby certify that I am currently a Metallurgical Engineering Consultant and owner of G. L. Simmons Consulting, LLC, 105 Chapel Road, Clyde Park, Montana 59018 and:

1. I graduated with a Bachelor of Science degree in Metallurgical Engineering from the Colorado School of Mines in 1973. I have worked as a metallurgical engineer in the mining industry for more than 30 years. I am a member of the Mining and Metallurgical Society of America (MMSA) and a Qualified Professional (QP) Member with special expertise in Metallurgy – Member Number—01013QP. I am also a member of the Society for Mining, Metallurgical and Exploration, Inc (SME).
2. 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 Fronteer Development Group Inc. and AuEx Ventures, Inc., and all of each of their subsidiaries, as defined in Section 1.4 of NI 43-101 and in Section 3.5 of the Companion Policy to NI 43-101.
3. I visited the Long Canyon project site most recently on June 23-24, 2009.
4. I am responsible for Section 16.0 (Mineral Processing and Metallurgical Testing) in this report titled, "***Updated Technical Report on the Preliminary Economic Assessment of the Long Canyon Project, Elko County, Nevada***", dated December 11, 2009 (the "Technical Report").
5. I have had no prior involvement with the property or project, other than on-going consulting activities for Fronteer, that is the subject of the Technical Report.
6. As of the date of the certificate, to the best of my knowledge, information, and belief, this Technical Report contains all the scientific and technical information that is required to be disclosed to make this technical report not misleading.
7. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.

Dated December 11, 2009

"Gary L. Simmons"

Gary L. Simmons

APPENDIX A

Long Canyon Project Federal Lode Mining Claims as of August 28, 2009

(compiled and provided by Fronteer Development Group Inc.)

Long Canyon Joint Venture

Elko County, Nevada

Township 35 North, Range 66 East, Sections 1-8, 11, 12

Township 36 North, Range 66 East, Sections 8, 14, 16-20, 22, 26, 28-32

Township 36 North, Range 65 East, Sections 24, 25, 36

Total Claims: 477

CLAIM NAME	LOCATION DATE	DATE FILED (COUNTY)	COUNTY DOCUMENT NO	DATE FILED (BLM)	BLM NMC#
PNG 293	09/14/1996	12/12/1996	399634	12/12/1996	757013
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PNG 295	09/14/1996	12/12/1996	399636	12/12/1996	757015
PNG 296	09/14/1996	12/12/1996	399637	12/12/1996	757016
PNG 297	09/14/1996	12/12/1996	399638	12/12/1996	757017
PNG 298	09/14/1996	12/12/1996	399639	12/12/1996	757018
PNG 299	09/14/1996	12/12/1996	399640	12/12/1996	757019
PNG 300	09/14/1996	12/12/1996	399641	12/12/1996	757020
PNG 301	09/14/1996	12/12/1996	399642	12/12/1996	757021
PNG 302	09/14/1996	12/12/1996	399643	12/12/1996	757022
PNG 303	09/14/1996	12/12/1996	399644	12/12/1996	757023
PNG 304	09/14/1996	12/12/1996	399645	12/12/1996	757024
PNG 305	09/14/1996	12/12/1996	399646	12/12/1996	757025
PNG 306	09/14/1996	12/12/1996	399647	12/12/1996	757026
PNG 307	09/14/1996	12/12/1996	399648	12/12/1996	757027
PNG 308	09/14/1996	12/12/1996	399649	12/12/1996	757028
PNG 309	09/14/1996	12/12/1996	399650	12/12/1996	757029
PNG 310	09/14/1996	12/12/1996	399651	12/12/1996	757030
PNG 311	09/14/1996	12/12/1996	399652	12/12/1996	757031
PNG 313	09/14/1996	12/12/1996	399654	12/12/1996	757033
PNG 315	09/14/1996	12/12/1996	399656	12/12/1996	757035
PNG 317	09/14/1996	12/12/1996	399658	12/12/1996	757037
PNG 319	09/14/1996	12/12/1996	399660	12/12/1996	757039
PNG 321	09/14/1996	12/12/1996	399662	12/12/1996	757041
PNG 323	09/14/1996	12/12/1996	399664	12/12/1996	757043
PNG 325	09/14/1996	12/12/1996	399666	12/12/1996	757045
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PNG 370	09/16/1996	12/12/1996	399711	12/12/1996	757090
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PNG 372	09/16/1996	12/12/1996	399713	12/12/1996	757092
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PNG 375	09/16/1996	12/12/1996	399716	12/12/1996	757095
PNG 376	09/16/1996	12/12/1996	399717	12/12/1996	757096
PNG 377	09/16/1996	12/12/1996	399718	12/12/1996	757097
PNG 378	09/16/1996	12/12/1996	399719	12/12/1996	757098
PNG 379	09/16/1996	12/12/1996	399720	12/12/1996	757099
PNG 380	09/16/1996	12/12/1996	399721	12/12/1996	757100

CLAIM NAME	LOCATION DATE	DATE FILED (COUNTY)	COUNTY DOCUMENT NO	DATE FILED (BLM)	BLM NMC#
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PNG 382	09/16/1996	12/12/1996	399723	12/12/1996	757102
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SM 291	01/05/2000	03/17/2000	456323	03/17/2000	814580
SM 292	01/05/2000	03/17/2000	456324	03/17/2000	814581
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SM 294	01/05/2000	03/17/2000	456326	03/17/2000	814583
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PQ 121	10/18/2005	12/22/2005	545921	01/11/2006	917841
PQ 122	10/31/2005	12/22/2005	545925	01/11/2006	917844
PQ 123	10/31/2005	12/22/2005	545926	01/11/2006	917845
PQ 124	10/31/2005	12/22/2005	545927	01/11/2006	917846
PQ 125	10/31/2005	12/22/2005	545928	01/11/2006	917847
PQ 126	10/31/2005	12/22/2005	545929	01/11/2006	917848
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PQ 128	10/31/2005	12/22/2005	545931	01/11/2006	917850
PQ 129	10/31/2005	12/22/2005	545932	01/11/2006	917851
PQ 130	10/31/2005	12/22/2005	545933	01/11/2006	917852
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PQ 132	10/31/2005	12/22/2005	545935	01/11/2006	917854
PQ 133	10/31/2005	12/22/2005	545936	01/11/2006	917855
PQ 134	10/31/2005	12/22/2005	545937	01/11/2006	917856
PQ 135	10/31/2005	12/22/2005	545938	01/11/2006	917857
PQ 136	10/31/2005	12/22/2005	545939	01/11/2006	917858
PQ 137	10/31/2005	12/22/2005	545940	01/11/2006	917859
PQ 138	10/31/2005	12/22/2005	545941	01/11/2006	917860
PQ 139	10/31/2005	12/22/2005	545942	01/11/2006	917861
PQ 140	10/31/2005	12/22/2005	545943	01/11/2006	917862
PQ 141	10/31/2005	12/22/2005	545944	01/11/2006	917863
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PQ 143	10/31/2005	12/22/2005	545946	01/11/2006	917865
PQ 144	10/31/2005	12/22/2005	545947	01/11/2006	917866
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PQ 148	10/31/2005	12/22/2005	545951	01/11/2006	917870
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PQ 234	02/08/2006	02/23/2006	549186	02/22/2006	920836
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PQ 237	02/08/2006	02/23/2006	549189	02/22/2006	920839
PQ 238	02/08/2006	02/23/2006	549190	02/22/2006	920840
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PQ 246	02/08/2006	02/23/2006	549198	02/22/2006	920848
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PQ 248	02/08/2006	02/23/2006	549200	02/22/2006	920850
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PQ 250	02/08/2006	02/23/2006	549202	02/22/2006	920852
PQ 251	02/08/2006	02/23/2006	549203	02/22/2006	920853
PQ 252	02/08/2006	02/23/2006	549204	02/22/2006	920854
PQ 253	02/08/2006	02/23/2006	549205	02/22/2006	920855
PQ 254	02/08/2006	02/23/2006	549206	02/22/2006	920856
PQ 265	01/14/2006	02/23/2006	549217	02/22/2006	920867
PQ 266	01/14/2006	02/23/2006	549218	02/22/2006	920868
PQ 267	01/14/2006	02/23/2006	549219	02/22/2006	920869
PQ 268	01/14/2006	02/23/2006	549220	02/22/2006	920870
PQ 269	02/08/2006	02/23/2006	549221	02/22/2006	920871
PQ 270	02/08/2006	02/23/2006	549222	02/22/2006	920872
PQ 271	02/08/2006	02/23/2006	549223	02/22/2006	920873
PQ 272	02/08/2006	02/23/2006	549224	02/22/2006	920874
PQ 273	02/08/2006	02/23/2006	549225	02/22/2006	920875
PQ 274	02/08/2006	02/23/2006	549226	02/22/2006	920876
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PQ 280	02/08/2006	02/23/2006	549232	02/22/2006	920882
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PQ 282	02/08/2006	02/23/2006	549234	02/22/2006	920884
PQ 283	02/08/2006	02/23/2006	549235	02/22/2006	920885
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PQ 285	02/08/2006	02/23/2006	549237	02/22/2006	920887
PQ 286	02/08/2006	02/23/2006	549238	02/22/2006	920888
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PQ 461	01/16/2006	04/06/2006	550877	04/06/2006	923332
PQ 462	01/16/2006	04/06/2006	550878	04/06/2006	923333
PQ 463	01/16/2006	04/06/2006	550879	04/06/2006	923334
PQ 464	01/16/2006	04/06/2006	550880	04/06/2006	923335
PQ 465	01/16/2006	04/06/2006	550881	04/06/2006	923336
PQ 466	01/15/2006	04/06/2006	550882	04/06/2006	923337
PQ 467	01/15/2006	04/06/2006	550883	04/06/2006	923338
PQ 468	01/15/2006	04/06/2006	550884	04/06/2006	923339
PQ 469	01/15/2006	04/06/2006	550885	04/06/2006	923340
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PQ 480	01/15/2006	04/06/2006	550896	04/06/2006	923351
PQ 481	01/15/2006	04/06/2006	550897	04/06/2006	923352
PQ 500	07/02/2006	08/08/2006	558065	08/10/2006	932047
PQ 501	07/02/2006	08/08/2006	558066	08/10/2006	930248
PQ 502	07/02/2006	08/08/2006	558067	08/10/2006	932049
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PQ 504	07/02/2006	08/08/2006	558069	08/10/2006	932051
PQ 505	07/02/2006	08/08/2006	558070	08/10/2006	932052
PQ 506	07/02/2006	08/08/2006	558071	08/10/2006	932053
PQ 507	07/02/2006	08/08/2006	558072	08/10/2006	932054
PQ 508	07/02/2006	08/08/2006	558073	08/10/2006	932055
PQ 509	07/02/2006	08/08/2006	558074	08/10/2006	932056
PQ 510	07/02/2006	08/08/2006	558075	08/10/2006	932057
PQ 511	07/02/2006	08/08/2006	558076	08/10/2006	932058
PQ 512	07/02/2006	08/08/2006	558077	08/10/2006	932059
PQ 513	07/02/2006	08/08/2006	558078	08/10/2006	932060
PQ 514	07/02/2006	08/08/2006	558079	08/10/2006	932061
PQ 515	07/02/2006	08/08/2006	558080	08/10/2006	932062
PQ 516 A	07/02/2006	08/08/2006	558081	08/10/2006	932063
PQ 517 A	07/02/2006	08/08/2006	558082	08/10/2006	932064
PQ 518 A	07/02/2006	08/08/2006	558083	08/10/2006	932065
PQ 519 A	07/02/2006	08/08/2006	558084	08/10/2006	932066
PQ 520 A	07/02/2006	08/08/2006	558085	08/10/2006	932067
PQ 521 A	07/02/2006	08/08/2006	558086	08/10/2006	932068
PQ 522 A	07/02/2006	08/08/2006	558087	08/10/2006	932069
PQ 523 A	07/02/2006	08/08/2006	558088	08/10/2006	932070
PQ 524 A	07/02/2006	08/08/2006	558089	08/10/2006	932071
PQ 516	01/16/2006	04/06/2006	550898	04/06/2006	923353
PQ 517	01/16/2006	04/06/2006	550899	04/06/2006	923354
PQ 518	01/16/2006	04/06/2006	550900	04/06/2006	923355
PQ 519	01/16/2006	04/06/2006	550901	04/06/2006	923356
PQ 520	01/16/2006	04/06/2006	550902	04/06/2006	923357
PQ 521	01/16/2006	04/06/2006	550903	04/06/2006	923358
PQ 522	01/16/2006	04/06/2006	550904	04/06/2006	923359
PQ 523	01/16/2006	04/06/2006	550905	04/06/2006	923360
PQ 524	01/15/2006	04/06/2006	550906	04/06/2006	923361
PQ 525	01/15/2006	04/06/2006	550907	04/06/2006	923362
PQ 526	01/15/2006	04/06/2006	550908	04/06/2006	923363
PQ 527	01/15/2006	04/06/2006	550909	04/06/2006	923364
PQ 528	01/15/2006	04/06/2006	550910	04/06/2006	923365
PQ 529	01/15/2006	04/06/2006	550911	04/06/2006	923366
PQ 530	01/15/2006	04/06/2006	550912	04/06/2006	923367
PQ 531	01/15/2006	04/06/2006	550913	04/06/2006	923368
PQ 532	01/15/2006	04/06/2006	550914	04/06/2006	923369
PQ 533	01/15/2006	04/06/2006	550915	04/06/2006	923370
PQ 534	01/15/2006	04/06/2006	550916	04/06/2006	923371

CLAIM NAME	LOCATION DATE	DATE FILED (COUNTY)	COUNTY DOCUMENT NO	DATE FILED (BLM)	BLM NMC#
PQ 535	01/15/2006	04/06/2006	550917	04/06/2006	923372
SM 416 A	11/12/2005	12/22/2005	546025	01/11/2006	917943
SM 416 A (amended)	05/30/2006	07/20/2006	557144	07/25/2006	
SM 418 A	11/12/2005	12/22/2005	546026	01/11/2006	917944
SM 418 A (amended)	05/30/2006	07/20/2006	557145	07/25/2006	
SM 420 A	11/12/2005	12/22/2005	546027	01/11/2006	917945
SM 420 A (amended)	05/30/2006	07/20/2006	557146	07/25/2006	
SM 422 A	11/12/2005	12/22/2005	546028	01/11/2006	917946
SM 422 A (amended)	05/30/2006	07/20/2006	557147	07/25/2006	
SM 424 A	11/12/2005	12/22/2005	546029	01/11/2006	917947
SM 424 A (amended)	05/30/2006	07/20/2006	557148	07/25/2006	
SM 424 A (amended)	05/30/2006	09/18/2006	557149	09/15/2006	
PQ 536	05/23/2006	08/11/2006	558245	08/14/2006	932340
PQ 537	05/23/2006	08/11/2006	558246	08/14/2006	932341
PQ 231	09/13/2006	10/20/2006	561980	10/23/2006	937215
PQ 232	09/13/2006	10/20/2006	561981	10/23/2006	937216
PQ 263	09/13/2006	10/20/2006	561982	10/23/2006	937217
PQ 264	09/13/2006	10/20/2006	561983	10/23/2006	937218
LC 1	05/09/2007	06/11/2007	574736	7/10/2007	960073
LC 2	05/09/2007	06/11/2007	574737	7/10/2007	960074
LC 3	05/09/2007	06/11/2007	574738	7/10/2007	960075
LC 4	05/09/2007	06/11/2007	574739	7/10/2007	960076
LC 5	05/09/2007	06/11/2007	574740	7/10/2007	960077
LC 6	05/09/2007	06/11/2007	574741	7/10/2007	960078
LC 7	05/09/2007	06/11/2007	574742	7/10/2007	960079
LC 8	05/09/2007	06/11/2007	574743	7/10/2007	960080
LC 9	05/09/2007	06/11/2007	574744	7/10/2007	960081
LC 10	05/09/2007	06/11/2007	574745	7/10/2007	960082
LC 11	05/09/2007	06/11/2007	574746	7/10/2007	960083
LC 12	05/09/2007	06/11/2007	574747	7/10/2007	960084
LC 13	05/09/2007	06/11/2007	574748	7/10/2007	960085
LC 14	05/09/2007	06/11/2007	574749	7/10/2007	960086
LC 15	05/09/2007	06/11/2007	574750	7/10/2007	960087
LC 16	05/09/2007	06/11/2007	574751	7/10/2007	960088
LC 17	05/09/2007	06/11/2007	574752	7/10/2007	960089
LC 18	05/09/2007	06/11/2007	574753	7/10/2007	960090
LC 19	05/09/2007	06/11/2007	574754	7/10/2007	960091
LC 20	05/09/2007	06/11/2007	574755	7/10/2007	960092
LC 21	05/09/2007	06/11/2007	574756	7/10/2007	960093
LC 22	05/09/2007	06/11/2007	574757	7/10/2007	960094
LC 23	05/09/2007	06/11/2007	574758	7/10/2007	960095
LC 24	05/09/2007	06/11/2007	574759	7/10/2007	960096
LC 25	05/09/2007	06/11/2007	574760	7/10/2007	960097
LC 26	05/09/2007	06/11/2007	574761	7/10/2007	960098
LC 27	05/09/2007	06/11/2007	574762	7/10/2007	960099
LC 28	05/09/2007	06/11/2007	574763	7/10/2007	960100
LC 29	05/09/2007	06/11/2007	574764	7/10/2007	960101
LC 30	05/09/2007	06/11/2007	574765	7/10/2007	960102
LC 31	05/09/2007	06/11/2007	574766	7/10/2007	960103
LC 32	05/09/2007	06/11/2007	574767	7/10/2007	960104
LC 50	12/04/2008	02/11/2009	609325	02/12/2009	1003791

CLAIM NAME	LOCATION DATE	DATE FILED (COUNTY)	COUNTY DOCUMENT NO	DATE FILED (BLM)	BLM NMC#
LC 52	12/04/2008	02/11/2009	609327	02/12/2009	1003793
LC 54	12/04/2008	02/11/2009	609329	02/12/2009	1003795
LC 56	12/04/2008	02/11/2009	609331	02/12/2009	1003797
LC 58	12/04/2008	02/11/2009	609333	02/12/2009	1003799
LC 60	12/04/2008	02/11/2009	609335	02/12/2009	1003801
LC 62	12/04/2008	02/11/2009	609337	02/12/2009	1003803
LC 67	12/04/2008	02/11/2009	609342	02/12/2009	1003808
LC 69	12/04/2008	02/11/2009	609344	02/12/2009	1003810
LC 71	12/04/2008	02/11/2009	609346	02/12/2009	1003812
LC 73	12/04/2008	02/11/2009	609348	02/12/2009	1003814
LC 75	12/04/2008	02/11/2009	609350	02/12/2009	1003816
LC 77	12/04/2008	02/11/2009	609352	02/12/2009	1003818
LC 79	12/04/2008	02/11/2009	609354	02/12/2009	1003820
LC 86	12/04/2008	02/11/2009	609361	02/12/2009	1003827
LC 88	12/04/2008	02/11/2009	609363	02/12/2009	1003829
LC 90	12/04/2008	02/11/2009	609365	02/12/2009	1003831
LC 92	12/04/2008	02/11/2009	609367	02/12/2009	1003833
LC 94	12/04/2008	02/11/2009	609369	02/12/2009	1003835
LC 99	12/04/2008	02/11/2009	609374	02/12/2009	1003840
LC 101	12/04/2008	02/11/2009	609376	02/12/2009	1003842
LC 103	12/04/2008	02/11/2009	609378	02/12/2009	1003844
LC 105	12/04/2008	02/11/2009	609380	02/12/2009	1003846
LC 107	12/04/2008	02/11/2009	609382	02/12/2009	1003848
LC 33 A	03/19/2009	06/10/2009	613900	06/10/2009	1007013
LC 34 A	03/19/2009	06/10/2009	613901	06/10/2009	1007014
LC 35 A	03/19/2009	06/10/2009	613902	06/10/2009	1007015
LC 36 A	03/19/2009	06/10/2009	613903	06/10/2009	1007016
LC 37 A	03/19/2009	06/10/2009	613904	06/10/2009	1007017
LC 38 A	03/19/2009	06/10/2009	613905	06/10/2009	1007018
LC 39 A	03/19/2009	06/10/2009	613906	06/10/2009	1007019
LC 40 A	03/19/2009	06/10/2009	613907	06/10/2009	1007020
LC 41 A	03/19/2009	06/10/2009	613908	06/10/2009	1007021
LC 42 A	03/19/2009	06/10/2009	613909	06/10/2009	1007022
LC 43 A	03/19/2009	06/10/2009	613910	06/10/2009	1007023
LC 44 A	03/19/2009	06/10/2009	613911	06/10/2009	1007024
LC 45 A	03/19/2009	06/10/2009	613912	06/10/2009	1007025
LC 46 A	03/19/2009	06/10/2009	613913	06/10/2009	1007026
LC 47 A	03/19/2009	06/10/2009	613914	06/10/2009	1007027
LC 48 A	03/19/2009	06/10/2009	613915	06/10/2009	1007028
LC 49 A	03/19/2009	06/10/2009	613916	06/10/2009	1007029
LC 51 A	03/19/2009	06/10/2009	613917	06/10/2009	1007030
LC 53 A	03/19/2009	06/10/2009	613918	06/10/2009	1007031
LC 55 A	03/19/2009	06/10/2009	613919	06/10/2009	1007032
LC 57 A	03/19/2009	06/10/2009	613920	06/10/2009	1007033
LC 59 A	03/19/2009	06/10/2009	613921	06/10/2009	1007034
LC 61 A	03/19/2009	06/10/2009	613922	06/10/2009	1007035
LC 63 A	03/19/2009	06/10/2009	613923	06/10/2009	1007036
LC 64 A	03/19/2009	06/10/2009	613924	06/10/2009	1007037
LC 65 A	03/19/2009	06/10/2009	613925	06/10/2009	1007038
LC 66 A	03/19/2009	06/10/2009	613926	06/10/2009	1007039
LC 68 A	03/19/2009	06/10/2009	613927	06/10/2009	1007040

CLAIM NAME	LOCATION DATE	DATE FILED (COUNTY)	COUNTY DOCUMENT NO	DATE FILED (BLM)	BLM NMC#
LC 70 A	03/19/2009	06/10/2009	613928	06/10/2009	1007041
LC 72 A	03/19/2009	06/10/2009	613929	06/10/2009	1007042
LC 74 A	03/19/2009	06/10/2009	613930	06/10/2009	1007043
LC 76 A	03/19/2009	06/10/2009	613931	06/10/2009	1007044
LC 78 A	03/19/2009	06/10/2009	613932	06/10/2009	1007045
LC 80 A	03/19/2009	06/10/2009	613933	06/10/2009	1007046
LC 81 A	03/19/2009	06/10/2009	613934	06/10/2009	1007047
LC 82 A	03/19/2009	06/10/2009	613935	06/10/2009	1007048
LC 83 A	03/20/2009	06/10/2009	613936	06/10/2009	1007049
LC 84 A	03/20/2009	06/10/2009	613937	06/10/2009	1007050
LC 85 A	03/20/2009	06/10/2009	613938	06/10/2009	1007051
LC 87 A	03/20/2009	06/10/2009	613939	06/10/2009	1007052
LC 89 A	03/20/2009	06/10/2009	613940	06/10/2009	1007053
LC 91 A	03/20/2009	06/10/2009	613941	06/10/2009	1007054
LC 93 A	03/20/2009	06/10/2009	613942	06/10/2009	1007055
LC 95 A	03/20/2009	06/10/2009	613943	06/10/2009	1007056
LC 96 A	03/20/2009	06/10/2009	613944	06/10/2009	1007057
LC 97 A	03/20/2009	06/10/2009	613945	06/10/2009	1007058
LC 98 A	03/20/2009	06/10/2009	613946	06/10/2009	1007059
LC 100 A	03/20/2009	06/10/2009	613947	06/10/2009	1007060
LC 102 A	03/20/2009	06/10/2009	613948	06/10/2009	1007061
LC 104 A	03/20/2009	06/10/2009	613949	06/10/2009	1007062
LC 106 A	03/20/2009	06/10/2009	613950	06/10/2009	1007063
LC 108 A	03/20/2009	06/10/2009	613951	06/10/2009	1007064
LC 109 A	03/20/2009	06/10/2009	613952	06/10/2009	1007065
LC 110 A	03/20/2009	06/10/2009	613953	06/10/2009	1007066
LC 111 A	05/13/2009	06/10/2009	613954	06/10/2009	1007067
LC 112 A	03/21/2009	06/10/2009	613955	06/10/2009	1007068
LC 113 A	05/13/2009	06/10/2009	613956	06/10/2009	1007069
LC 114 A	03/21/2009	06/10/2009	613957	06/10/2009	1007070
LC 115 A	05/13/2009	06/10/2009	613958	06/10/2009	1007071
LC 116 A	03/21/2009	06/10/2009	613959	06/10/2009	1007072
LC 117 A	05/13/2009	06/10/2009	613960	06/10/2009	1007073
LC 118 A	03/21/2009	06/10/2009	613961	06/10/2009	1007074
LC 119 A	05/13/2009	06/10/2009	613962	06/10/2009	1007075
LC 120 A	03/21/2009	06/10/2009	613963	06/10/2009	1007076
LC 121 A	05/13/2009	06/10/2009	613964	06/10/2009	1007077
LC 122 A	03/21/2009	06/10/2009	613965	06/10/2009	1007078
LC 123 A	05/13/2009	06/10/2009	613966	06/10/2009	1007079
LC 124 A	03/21/2009	06/10/2009	613967	06/10/2009	1007080
LC 125 A	05/13/2009	06/10/2009	613968	06/10/2009	1007081
LC 126 A	03/21/2009	06/10/2009	613969	06/10/2009	1007082
LC 127 A	05/13/2009	06/10/2009	613970	06/10/2009	1007083
LC 128 A	03/21/2009	06/10/2009	613971	06/10/2009	1007084
LC 129 A	05/13/2009	06/10/2009	613972	06/10/2009	1007085
LC 130 A	03/21/2009	06/10/2009	613973	06/10/2009	1007086
PNG 383	09/16/1996	12/12/1996	399724	12/12/1996	757103
PNG 384	09/16/1996	12/12/1996	399725	12/12/1996	757104
PNG 385	09/16/1996	12/12/1996	399726	12/12/1996	757105
PNG 386	09/16/1996	12/12/1996	399727	12/12/1996	757106
PNG 387	09/16/1996	12/12/1996	399728	12/12/1996	757107

CLAIM NAME	LOCATION DATE	DATE FILED (COUNTY)	COUNTY DOCUMENT NO	DATE FILED (BLM)	BLM NMC#
PNG 388	09/16/1996	12/12/1996	399729	12/12/1996	757108
PNG 389	09/16/1996	12/12/1996	399730	12/12/1996	757109
PNG 390	09/16/1996	12/12/1996	399731	12/12/1996	757110
PNG 391	09/16/1996	12/12/1996	399732	12/12/1996	757111
PNG 392	09/16/1996	12/12/1996	399733	12/12/1996	757112
PNG 393	09/16/1996	12/12/1996	399734	12/12/1996	757113
PNG 394	09/16/1996	12/12/1996	399735	12/12/1996	757114
PNG 395	09/16/1996	12/12/1996	399736	12/12/1996	757115
PNG 396	09/16/1996	12/12/1996	399737	12/12/1996	757116
PNG 397	09/16/1996	12/12/1996	399738	12/12/1996	757117
PNG 398	09/16/1996	12/12/1996	399739	12/12/1996	757118
PNG 399	09/16/1996	12/12/1996	399740	12/12/1996	757119
PNG 400	09/16/1996	12/12/1996	399741	12/12/1996	757120
SM 319	01/04/2000	03/17/2000	456351	03/17/2000	814608
SM 320	01/04/2000	03/17/2000	456352	03/17/2000	814609
SM 321	01/04/2000	03/17/2000	456353	03/17/2000	814610
SM 322	01/04/2000	03/17/2000	456354	03/17/2000	814611
SM 323	01/04/2000	03/17/2000	456355	03/17/2000	814612
SM 324	01/04/2000	03/17/2000	456356	03/17/2000	814613
SM 337	01/05/2000	03/17/2000	456369	03/17/2000	814626
SM 338	01/05/2000	03/17/2000	456370	03/17/2000	814627
SM 339	01/05/2000	03/17/2000	456371	03/17/2000	814628
SM 340	01/05/2000	03/17/2000	456372	03/17/2000	814629
SM 341	01/05/2000	03/17/2000	456373	03/17/2000	814630
SM 342	01/05/2000	03/17/2000	456374	03/17/2000	814631
SM 362	01/06/2000	03/17/2000	456394	03/17/2000	814651
SM 364	01/06/2000	03/17/2000	456396	03/17/2000	814653
SM 366	01/06/2000	03/17/2000	456398	03/17/2000	814655
SM 368	01/06/2000	03/17/2000	456400	03/17/2000	814657
SM 370	01/06/2000	03/17/2000	456402	03/17/2000	814659
SM 372	01/06/2000	03/17/2000	456404	03/17/2000	814661
SM 374	01/06/2000	03/17/2000	456406	03/17/2000	814663
SM 376	01/06/2000	03/17/2000	456408	03/17/2000	814665
SM 378	01/06/2000	03/17/2000	456410	03/17/2000	814667