SEDA SITKA ECONOMIC DEVELOPMENT ASSOCIATION
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Monday, June 03, 2013

MEMORANDUM

To: Mayor McConnell and Members of the Assembly

From: Garry White – Executive Director

Subject: Geotechnical Survey to Explore Mining Potential in the Sitka Area

Introduction

The Sitka Economic Development Association (SEDA) is requesting that the City and Borough of Sitka (CBS) consider funding the attached proposal from Avalon Development Corporation to conduct a geotechnical survey of the Green Lake Road and allow access to the identified CBS property. Please see attached proposal.

Background

In 2012, SEDA received investor funding to commission a preliminary report on the mineral prospectivity of the Sitka area. Avalon Development completed and provided the attach report. Curt Freeman, President of Avalon Development traveled to Sitka in April 2012 and presented the report to the SEDA Board with an invitation for Assembly members to attend the presentation.

SEDA hosted and facilitated an Economic Forum on April 16, 2013. The goal of the forum was to collaborate, and find new economic development ideas, particularly ideas that could bring new money into the local economy. The ultimate goal was to improve and stabilize Sitka's economy by generating new economic activity.

The roughly 40 participants of the forum were asked to vote on the ideas brought forward during the forum by the public. The idea of "Explore Mining Potential along Green Lake Road" received the third highest votes by the group. An Ad-hock committee was formed to pursue the concept.

The SEDA Board of Directors met in May, 2013 to discuss the proposal from Avalon Development and approved the attached Resolution. Please see the attached resolution.

The proposed geotechnical survey will be the first step in determining the likelihood of mining potential in the Sitka area. If favorable mineral content in found, this exploratory survey will act as an attractant for future investment in to the community and economy.

The mining industry has the potential to bring investment and create jobs for Sitka during exploration, development, and operation. An operational mine will provide significant tax revenue for the community.

Action

SEDA requests financial support and access approval to complete the attached proposal from Avalon Development for a geotechnical survey.

Results from the geotechnical survey will be released to the CBS and public once completed.

Considerations for Pursuing Mining Development for the Sitka Area
May, 2013 – SEDA

Economic Benefits

Exploration

- In 2012 $275 million was spent on mineral exploration in Alaska.
- Mineral exploration employs geologists, engineers, assayers, and lab technicians.

Development

- In 2012 $270 million was spent on mine construction and other capital investment developing mineral resources in Alaska.
- Mine development employs mining engineers, construction workers, surveyors, and specialists in: business planning, law, permitting, and human resources.

Operation

- Operating mines are large property holders and can provide significant property tax revenues to the local community.
    - In FY2012 HECLA Greens Creek Mining and Coeur Alaska (Kensington Gold Mine) were the two top property tax payers for the CBJ, paying a total of $2.7 million in property taxes. (Source: CBJ FY2012 CAFR)
- In 2012, the average payroll wage for those working in the mining industry was $100,000, over twice the state average for all sectors of the economy.
- Mining is a primary industry that exports a product and brings new money into the local and economy.
    - In 2011, Alaska's mining exports were valued at $2 billion (38% of the state's total exports).
- Most jobs in mining are year-round jobs.

(Source: The Economic Benefits of Alaska's Mining Industry, January 2013. Alaska Miners Association, Inc.*)*

Exploration, development, and operational activities bring revenues to local contractors and businesses that provide supporting goods and services directly to the mine and to its employees that live in the community.

Mining Payroll Employment in the Juneau Area since April 2012 (Kensington Mine in full production)

	2nd Quarter 2012	**3rd Quarter 2012**
Average employment in mining	666	720
Average monthly wage mining jobs	$8,190	$7,301
Total payroll earnings mining jobs	$16,363,427	$15,769,902

(Source: Alaska Department of Labor *Quarterly Census of Employment & Wages*)

TO: Garry White, Executive Director
Ken Cameron, Director
Sitka Economic Development Association

FROM: Curt Freeman
Avalon Development Corp.

DATE: April 9, 2013

SUBJECT: Green Lake Road geochemical sampling program

As per our recent communications, the following is a draft work program and cost estimate to conduct surface geochemical sampling along about an 8-mile stretch of the Green Lake Road between Sawmill cove and the lower end of Green Lake, in the Sitka-Chichagof Gold Belt near Sitka, Alaska.

ASSUMPTIONS

I have used the following assumptions to formulate a work program and cost estimate for the deliverables outlined at the end of this estimate:

1. Sitka Economic Development Association (SEDA) will obtain access permission for Avalon Development along Green Lake Road between Sawmill Cove and the lower end of Green Lake.
2. Avalon will conduct surface rock and soil geochemical sampling along Green Lake Road but will conduct no drilling, trenching or other activity along the Green Lake Road right of way that would normally require application and receipt of local, Federal or State of Alaska permits.
3. Avalon will leave no flagging, wooden pickets, metal tags or other commonly used sample location markers along the Green Lake Road right of way to mark the location of samples collected. Sample location points will be controlled only by GPS coordinates collected by Avalon at the time of sampling.
4. Avalon will be responsible for the safety of its employees and contractors working along the Green Lake Road right of way and will comply with all safety procedures required by regulatory agencies having jurisdiction along Green Lake Road.
5. Avalon will supply all personnel, equipment, expendable supplies and supervision to complete the work proposed.
6. Avalon will perform work to current industry accepted best management practice standards.
7. Shee Atika Group, for whom Avalon has conducted confidential mineral industry-related business in the past, will provide Avalon and SEDA with a Letter of Non-objection indicating that it has no objection to Avalon performing the work outlined here, even if such work leads to similar conclusions that Avalon has presented under contract to Shee Atika in the past.

8. SEDA and Avalon will work together to formulate a land status map of that portion of Green Lake Road where sampling is intended to insure that no trespass occurs on private lands along the right of way.
9. Avalon will utilize only non-confidential mineral and land status data that currently is in the public domain and private reports prepared for SEDA in the past.
10. Avalon will prepare and present a written summary to SEDA outlining the findings of its field work, along with all raw data from that work. These data shall become and remain the sole property of SEDA.
11. All products deliverable to SEDA will be in a digital format that is acceptable to SEDA.

WORK PROGRAM SUMMARY

The strategic goal of the proposed work program is to collect geochemical samples from bedrock exposures along the Green Lake Road to help identify prospective gold exploration targets in the Silver Bay portion of the Sitka-Chichagof Gold Belt. This sampling will represent the first modern exploration program to be conducted in the Sitka-Chichagof Gold Belt since the mid-1980's. Analytical results can then be made available to prospective mineral exploration companies capable to conducting their own mineral exploration and development activities in the Silver Bay area.

The proposed Green Lake Road geochemical sampling program will consist of three separate parts: pre-field planning, field geochemical sampling and post-field evaluation and data presentation.

Pre-Field Planning: This phase of the Green Lake Road program will consist primarily of obtaining access permission along the restricted portion of the Green Lake Road, arranging transportation and accommodations for 2 or 3 Avalon geologists during their stay in Sitka, arranging personnel and air freight logistics to and from Sitka and preparing preliminary field maps to assist in field operations, including geologic maps, land status maps, topographic maps and air photo images.

Avalon personnel will consist of 2 or 3 experienced Senior and Junior Geologists that will fly to Sitka with sufficient field supplies to conduct the entire 5 to 7-day field program. Since the work is not dependent on helicopter support, weather days do not need to be taken into consideration except to the degree that the sampling program should be conducted after all winter snow and ice are gone from outcrops along the Green Lake Road.

Avalon personnel can stay in hotel or apartment lodgings for the duration of the program. Avalon will look to SEDA to help them identify suitable lodging that does not object to wet and dirty geologists in their establishment. A secure place to temporarily store samples before they are shipped to the geochemical laboratory will also be required. With SEDA's assistance, Avalon will arrange for meals at local restaurants during their stay in Sitka.

Avalon will need to rent a vehicle of sufficient size to accommodate up to 3 people, their field gear and all sampling equipment and supplies as well as all samples collected during the

project. SEDA's advice will be sought as to whether a 4WD vehicle is required for the work anticipated.

Accurate land status maps will need to be created along the entire 8-mile sampling route from Sawmill Cove to the lower end of Green Lake. The preliminary land status maps created for the 2012 Sitka-Chichagof report shows much of the Green Lake Road as being mixed U.S. Forest Service plus State plus other private lands. The type of sampling anticipated does not require permits from the State of Alaska or the USFS however permission to access and sample private lands will be required if such lands are identified along the route. SEDA will endeavor to obtain written permission to access and sample private lands along with unrestricted publication rights on the technical data gathered on SEDA's behalf.

Field Program Execution: The field portion of the Green Lake Road program will entail collection of approximately 350 rock samples along the road right of way at any locality that displays signs of hydrothermal alteration and/or mineralization typical of turbidite-hosted orogenic gold deposits. The key characteristics that separate turbidite-hosted orogenic gold deposits from other types of gold deposits are all present in the Sitka – Chichagof gold belt. Those primary diagnostic characteristics include host rock type and depositional setting, vein textures, vein continuity and morphology, primary and secondary sulfides, wallrock alteration, structural controls, fluid chemistry, gold fineness, depth of emplacement and tectonic regime (see 2012 Sitka-Chichagof report for details). At the outcrop scale, prospective mineralization may manifest itself as thin quartz veins (with or without oxide/sulfide content), sheeted or web-textured quartz veinlets, sulfide-bearing shear zones, iron and/or arsenic oxide staining and disseminated sulfide/oxide in carbonaceous host rocks.

The Alaska Resource Data File (ARDF) for the Sitka Quadrangle shows four mineral occurrences along or near the Green Lake Road (SI-181, 182, 183 and 185) while the ARDF for the adjoining Port Alexander Quadrangle shows an additional two mineral occurrences along or near the Green Lake Road (PA-2 and 4, Figure 1). The accuracy of these locations is suspect and may be in error by as much as a mile so no extraordinary attempts will be made to locate these historic prospects. However these prospects constitute the central portion of a series of gold prospects extending over an 11 mile distance from the north flank of Mt. Arrowhead on the northwest to the south flank of Lucky Chance Mountain on the southeast. The prospects along this trend, including the infamous Stewart and Lucky Chance prospects, are comprised of gold-quartz veins with sparse sulfides, usually pyrite and lesser arsenopyrite. Analytical results indicate anomalous arsenic even if arsenopyrite was not identified in hand specimens. Anomalous mercury, to several parts per million, also are present at some prospects. The veins are often parallel to the bedding of the host rock which is graywacke and argillite of the Cretaceous Sitka Graywacke.

Wherever possible, continuous rock channel samples will be collected to allow grade and thickness to be determined. All sample sites will be located by hand-held GPS and all samples will be described as to host lithology, color, oxidation, sulfide content, vein type and thickness, and other pertinent physical characteristics. A digital image will be collected at each sample site and retained for later reference purposes. Digital photographs also will be taken wherever significant mineralization is observed. Geochemical samples will be placed in canvas sample bags marked only with a unique 6-digit sample number.

All samples will be kept under the control of Avalon personnel until they are shipped via Alaska Air Freight to Avalon's Fairbanks office. Once received, Quality Assurance/Quality Control (QA/QC) samples will be inserted into the sample stream on a 1 for 10 sample basis. QA/QC samples will consist of geochemically unmineralized blank material composed of Browns Hill Quarry basalt from the Fairbanks area and commercially prepared standards containing pre-determined levels of gold and trace metals. Once QA/QC samples have been inserted into the sample stream, the samples will be collected by ALS Chemex, one of the mining industry's foremost geochemical laboratories, for treatment in their Fairbanks sample preparation facility. A representative part of each sample, known as a pulp, will be sent for analysis to ALS Chemex's Vancouver laboratory in North Vancouver, British Columbia. Analytical work will consist of gold by fire assay methods with atomic absorption finish (FA-AA) plus multi-element inductively coupled plasma atomic emission spectrography (ICP-AES) analyses using 4-acid digestion. The results are reported only to Avalon on a secure web retrieval system managed by ALS Chemex.

Post-Field Evaluation and Documentation: Following return of the geochemical results (2 to 4 weeks after lab submission) Avalon Development will compile a GIS-based summary report of the geochemical results including detailed descriptions of samples collected. The final products will include a written summary report with figures and larger-format plates as required. In addition, the final report will be accompanied by a GIS-based database that includes all of the data discussed or portrayed in the text, figures and plates. Geochemical results will be supplied in digital form along with GPS coordinates to allow possible follow-up work in areas where anomalous results occur. Primary references from which technical information was drawn also will be supplied with the final report. Recommendations will be presented as to future mineral exploration work that is warranted.

COST ESTIMATE

Based on the above assumptions, Avalon Development Corp. can complete the above outlined work program for an estimated cost of US$72,000 (Table 1).

Table 1: Cost estimates for the Green Lake Road geochemical sampling program, Sitka-Chichagof Gold Belt, Alaska. All values in U.S. dollars.

Item	Cost	Percentage
Labor	40,304	55.8%
Expendables	4,015	5.6%
Room and Board	4,406	6.1%
Geochemistry	13,552	18.8%
Contracted Services	935	1.3%
Communications/Electronics	440	0.6%
Administrative Costs	845	1.2%
ADC Management Fee	7,740	10.7%
Total:	$72,237	

The above cost estimates include a variable built-in contingency of approximately 10% to cover unforeseen or unavoidable costs related to such items as access delays, crew illness, flooding, landslides, etc.

If this proposal is acceptable to Sitka Economic Development Association, Avalon can perform this work under our existing Professional Services Agreement with this document acting as an additional Exhibit to govern the legal and performance aspects of the proposed Green Lake Road geochemical sampling program.

Filename: SEDA_MEM2.DOC

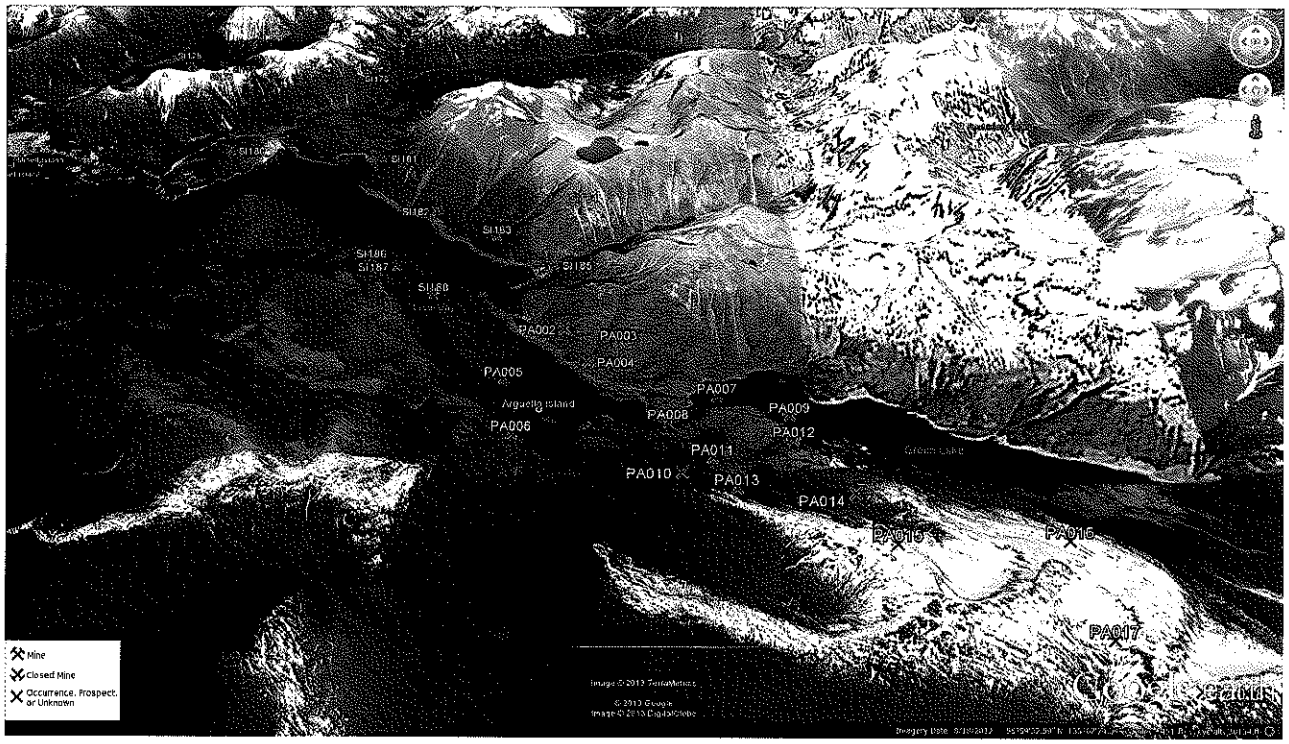

FIGURE 1: Google Earth image with Alaska Resources Data File mineral occurrences along the Green Lake Road, Sitka and Port Alexander Quadrangles, Alaska.

AVALON DEVELOPMENT CORPORATION
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GEOLOGIC REPORT SEDA12-1

PRELIMINARY REPORT ON THE MINERAL PROSPECTIVITY OF THE SITKA REGION, SOUTHEASTERN ALASKA

prepared for

Sitka Economic Development Association
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prepared by

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April 24, 2012

INTRODUCTION

The following report was commissioned by Garry White as Executive Director of the Sitka Economic Development Association (SEDA) as part of an effort to determine the economic prospectivity of metallic mineral deposits in the greater Sitka, Alaska, area.

Initial scoping work for SEDA was completed in April 2012 and includes a geographic information system (GIS) compilation of 133 mineral occurrences within 50 miles of Sitka, with most of these prospects being within 25 miles of Sitka. The database also contains locations for an additional 90 prospects within Wilderness areas under jurisdiction of the U.S. Forest Service. Most of the prospects within Wilderness areas are within the West Chichagof - Yakobi Wilderness on Chichagof Island northwest of Sitka. This report was generated using these data along with historical and technical data generated by the authors. This report and the accompanying GIS data were transmitted to SEDA in late April and a summary of the findings was presented to SEDA by the senior author shortly afterwards.

DISCLAIMER

This report has been prepared by using public documents acquired by the author and private documents given to the author by SEDA for the above-stated purpose. While reasonable care has been taken in preparing this report, Avalon cannot guarantee the accuracy or completeness of all supporting documentation. In particular, Avalon did not attempt to determine the veracity of geological, geochemical or geophysical data reported by other parties, nor did Avalon attempt to conduct duplicate sampling for comparison with the geochemical results provided by other parties. The interpretive views expressed herein are those of the authors and may or may not reflect the views of SEDA.

SCOPE

The purpose of this report was two-fold: 1) to determine the mineral prospectivity of State, private and Federal lands that are open to mineral development in the Sitka area and, 2) if mineral prospectivity was considered significant, determine how best to attract mineral investment dollars to these prospective lands. Lands within the West Chichagof - Yakobi Wilderness are not open to location however the Chichagof and Hirst-Chichagof mines, which are within this wilderness, were examined because of their significant gold and silver production (791,000 ounces of gold and 228,000 ounces of silver) and because of their remarkable similarity to mineral prospects open to mineral development outside of the wilderness area. Priority was given to prospects located within the Tongass National Forest and on State Selected lands although private claim holdings were also included as prospective targets in some areas. Mineral prospects outside of Baranof and Chichagof islands were excluded from consideration, primarily due to their distance from Sitka.

LAND STATUS

The general land status of the Sitka area is shown on Plate 1. The land under scrutiny is largely U.S. Forest Service multiple-use lands (open to mineral entry), with State-selected lands as the next most abundant land. The State-selected lands are largely confined to the area south of Nakwasina Sound and north of Lucky Chance Mt. This State-selected land underlies a significant number of historic gold prospects along the north side of Silver Bay, suggesting that their selection for possible patent to the State of Alaska was justified by the mineral potential in this area. Private land is most common in the greater Sitka area but makes up only a small percentage of the total land base within the area under consideration. There area also some small parcels of Native-Select lands at the head of Katlian Bay.

Two large areas of Wilderness land occur in the Sitka area. The South Baranof Wilderness is located southeast of Sitka and encompasses only a few known mineral occurrences, none of which have reached commercial production in the past. The West Chichagof – Yakobi Wilderness is located to the northwest of Sitka and encompasses dozens of small and several large lode gold prospects and past-producing lode gold mines (Plate 1). The significance of these old mines and prospects will be discussed later in this report. Although the Wilderness status of the South Baranof and West Chichagof – Yakobi Wilderness areas does not preclude mineral development, the lands are not open to mineral location and can only be developed if the area proposed for development is excised from the Wilderness area. While technically possible, the chances are remote that such an excision could be accomplished given the current political climate.

The status of both Native Select and State Select lands is in a state of constant flux. The Federal government has been pressuring Alaska to finalize its 104 million acre land entitlement but that entitlement is secondary to the 44 million acre Native land entitlement mandated by ANCSA. The Alaska regional Native corporations have accelerated their selection process, as has the State of Alaska but the likelihood and time-frame remain uncertain for Native-selected lands becoming approved for conveyance and/or State-selected lands becoming Tentatively Approved for patent. Based on the author's current knowledge of the land selection process, the State of Alaska has prioritized its selections in several categories. The highest priority lands will almost certainly be Tentatively Approved for patent to the State whereas the lowest priority status will almost certainly be relinquished to the Federal government.

According to the State of Alaska's mining claim information system, there currently are only four 20-acre unpatented federal mining claims in the Sitka area. These four claims occur in two 2-claim blocks. One of these blocks sits over the old Edgecombe Exploration Bonanza 21 and 22 prospect on the west side of Silver Bay. The other block of claims is about three-quarters of a mile to the southeast, at tidewater on the divide between the Salmon Creek and Green Lake drainages. The rest of the study is open to mining claim location.

HISTORICAL BACKGROUND

One of the first questions that mineral exploration geologists reviewing the Sitka Mining District are sure to ask is "If there is significant mineral potential here, why hasn't somebody discovered a significant ore body in this district in the last 100 years?" An understanding of the mining history of the Sitka area is required in order to answer that question and realize the opportunity it affords the current generation of exploration geologists. The following brief history of mineral exploration and development in the Sitka area will help answer the question posed above. Although several sources have been drawn on, those of DeArmond (1997), Hunter (2006) and Reed and Coats (1941) are the most comprehensive.

The Sitka area contains some of the oldest placer (alluvial) and lode (hard rock) mines in Alaska. The first reported discovery of gold in the Sitka area dates to 1871 when Edward Doyle, a retired Army office, discovered gold in the gravels of the Indian River, a few miles northeast of Sitka (Hunter, 2006). As was common for the period, a frenzy of claim staking, wild speculation and some actual lode and placer gold discoveries followed. By October 1872 William Dunlap and Frank Mahoney had staked the first lode (hard rock) claim over a gold-bearing quartz vein exposed in the Indian River valley. Discoveries in and around Silver Bay, located several miles southeast of Sitka, soon followed, with staking of placer claims in 1872 and 1873. DeArmond (1997) states that Major Joseph Stewart and A. H. Prince, both with the U.S. Army at Sitka, located the Stewart lode prospect on May 29, 1873. However, Knopf (1912) puts the date of discovery of the Stewart lode as October 1872. The Stewart property was to play a significant role in the pre-1900 history of the Sitka area.

Not long after that, the first in a series of events occurred that made the Sitka Mining District infamous and set it on it path toward a long period of mediocrity, lasting to the present. On December 14, 1874, brothers Allen B. and Edward H. Francis staked the Francis lode claim on Lucky Chance Mt. in the Silver Bay area. The same day they made a $40 profit by selling one-third of their interest to Herbert Gaston, a Canadian investor, and another one-third of their interest to Nicholas Haley, a soon-to-be fixture of mining speculation in the Sitka area. By April 1875, Haley, reputed to be an experienced mining man, had sold one-quarter of his one-third stake to various Sitka residents for $225, a significant sum in 1875 (Hunter, 2006).

By the late 1870's, over 40% of Sitka was employed in the gold mining industry (Hunter, 2006). Haley, among others, formed at least four additional stock companies before 1880. Keeping men employed in the mines was difficult because they often struck out on their own as soon as they had been given enough training to do so. New claims were staked all over the district, each purported to be better than anything else previously found in the district. However, few of these new finds produced any gold and those that did, produced only small amounts that were far too little to repay the investments made on them.

Nicholas Haley continued to stake, buy and sell mining claims over the next 20 years, raising capital for these ventures in Sitka, where he sold stock at half-price to children, as well as the rest of the Unites States. One of the largest such investment schemes was the formation of the Alaska Gold and Silver Mining Company, formed in Portland in 1877. Haley and Joseph Stewart contributed their mining claims to the Alaska Gold and Silver Mining Company and this

entity became the new owner of the Stewart mine. By 1879 the company had raised enough funds to purchase a 10-stamp gold mill (DeArmond, 1997). This new stamp milling equipment landed in Sitka in early 1880. It consisted of the usual stamp mill and mercury-amalgam finishing circuit, but also included a "chlorine apparatus" (DeArmond, 1997) which suggests that somebody in the Alaska Gold and Silver Mining Co. thought that a chlorination plant was required for gold recovery at the Stewart mine. The chlorination process was invented in Australia in the 1860s for gold recovery from metallurgically difficult ores but nothing in the historic record suggests that refractory ore requiring chlorination exists in the Silver Bay area. Abundant records from the Chichagof area show it was not required there either (Reed and Coats, 1941). By mid-1880 the stamp mill was up and running , making it the first such mill erected in Alaska. No mention of the chlorine circuit was found in the documents available to the authors.

In order to insure the success of the Stewart mine, the company also hired George Pilz, a reputable mining man, to run the mine. However, within a year, Pilz had determined that the mine was not going to produce sufficient ore to feed the mill. He grubstaked teams of men to go out to find new prospects that might feed the now-empty mill. In a twist of fate that brought nothing good to the Sitka area, two of these grubstaked prospectors, Richard Harris and Joseph Juneau, eventually discovered rich placer gold deposits in what became the prolific Juneau Mining District. With Pilz's interest clearly waning at Sitka, he was fired in 1880 and the mine was closed. Following more than a decade of protracted litigation, the mine was acquired by T.C. Doran in 1892 and optimistically renamed the Cash Mine. Doran's subsequent death ended his attempts to reopen the mine and no further work has been done on the prospect (Bittenbender and others, 1999). In summary, the Stewart mine was a failure and the investors in the Alaska Gold and Silver Mining Company had lost their investments. But Nicholas Haley was not done with Sitka yet.

By 1884 Haley had convinced an entirely new crop of eager investors to buy and/or invest money in his mining properties in the Silver Bay area. He even convinced Alaska Governor Alfred Swineford to invest in his schemes in 1886. One such Haley company, the Lake Mountain Mining Company, in which Governor Swineford and several other Sitka luminaries were involved, began work in the spring of 1886 at the Lucky Chance mine (the old Francis lode). By early May, ore from the mine was brought to the company assay office in Sitka for testing and Haley quickly announced the exceedingly high value of the ore, $1,760 per ton (Hunter, 2006). At then-current gold prices of $20.67 per ounce, the ore contained over 85 ounces of gold in every ton of rock. This at a time when average ore grades for mines in Alaska were 1 ounce of gold per ton or less. Haley claimed this rock was 'representative" of average ore from the mine. In fact, the samples were deliberately "high graded", one of the oldest and crudest tricks in the mining game, whereby a knowledgeable person carefully selects only the richest pieces of ore and assays only that part of the average ore. To the experienced geologist or mining engineer, the trick would never pass muster but, to the already-invested shareholder or the would-be shareholder, most of whom were untrained in the realities of the mining industry, the chance to get rich quick was too good of an opportunity to pass up.

On the strength of these fantastic but misleading numbers, additional funds were expended at Lucky Chance such that by October of 1886 the company had invested over $175,000 in the mine (over $4 million in 2012 dollars). Haley took additional samples with him

on his fund raising trips, all of which were purposely picked to impress anyone who saw them. By early 1887 he had helped raise enough money to purchase and ship a 5 stamp gold mill to Sitka. This equipment was installed and began operation on July 23, 1888, and continued until seasonal shut-down in October. The mine reported that it had recovered $28 worth of gold in each ton of ore milled (1.35 oz/ton) with tailings (waste) containing an additional 0.43 oz/ton (DeArmond, 1997). Over the winter months Haley continued prospecting and stoking the fires of investors. The fervor over gold caused new claims to be staked all over the district, three of which were owned Governor Swineford (Hunter, 2006). Construction started on an overhead tram about 3,000 feet in length that would be used to ship ore down the steep hill side from the mine to the mill. Bittenbender and others (1999) indicate that a meager 60 tons of ore had been processed before the mine and mill were abruptly closed prior to the 1890 summer season. Litigation followed and the mine sat idle until 1892 when it was sold to Sitka businessman T.C. Doran, who renamed it the Cash mine. His attempt to bring the mine back to production failed when he died of accidental cyanide poisoning while testing his own ore samples (DeArmond, 1997). The Lucky Chance mine was never worked again. It was, like the Stewart mine before it, a failure, and the investors in the Lake Mountain Mining Company had lost their investments.

Five years later, the largest mining scam to ever affect the Sitka area began. Hans Christian Pande staked a placer gold claim at Glacier Lake about 10 miles east of Sitka. Although Pande attempted to inflate the value of his claim, two years passed before his employer, Benjamin Moore, acquired ownership of the claim. He formed the Pande Basin Gold Placer Company and set about raising money from Wall Street investors. With the Klondike Gold Rush drawing the interests of millions world-wide, it was a relatively easy matter to get newspapers to publish wildly promotional articles on the discovery at Pande Basin, just as long as the proclamations sounded better than the riches being one from the Klondike. Moore trumpeted the area's value and went a step further by hiring Henry I. Willey, a reputable mining engineer to visit the claims and collect his own samples. Willey collected 19 samples which contained spectacular values ranging from $100 to $900 per ton (4.8 to 43 ounces per ton). Willey suspected that ground had been "salted" another crude trick in the mining industry where gold from another source is sprinkled where the unsuspecting sampler will find it and thereby falsely inflate the value of the property. Willey collected more samples to see if his suspicions were correct but they were lost in a boating accident while he was crossing Blue Lake on the way back to Sitka. Based on the earlier, possibly false results, Moore was having no trouble raising money from Wall Street investors. The water level of Glacier Lake, under which the gold was purported to be, was lowered by 50 feet in order to access the supposedly gold-bearing gravels, however, no gold was found and the company's stock crashed. By the end of 1899 all operations at Pande Basin has ceased. The Pande Basin mine, like the Lucky Chance and Stewart mines before it, was a failure and the investors in the Pande Basin Gold Placer Company had lost their investments.

By the dawn of the 20th century Sitka's reputation as the mining scam capital of Alaska was both well established and well deserved. By 1905, two of Alaska's most profitable mines, the Chichagof and Hirst-Chichagof, had been discovered only 50 miles northwest of Sitka. What little mining interest remained in the immediate Sitka area quickly moved to the area around the Chichagof and Hirst-Chichagof discoveries. The Chichagof promptly went into production in 1906 and remained in production through 1942. During this period the mine produced 660,000 ounce of gold and 195,000 ounces of silver from about 600,000 tons of ore averaging 1.1 ounces

of gold per ton and 0.3 ounces of silver per tonne (Berg and Grybeck, 2005). The smaller Hirst-Chichagof mined 140,000 tons of ore between 1922 and 1933 and produced 131,000 ounces of gold and 33,000 ounces of silver grading 0.94 ounces of gold per ton and 0.24 ounces of silver per tonne. Dozens of other smaller mines and prospects produced lesser amounts of gold and silver in the 6-mile square region between the head of Klag Bay and Kimshan Cove.

With mines operating and profits being made in what became known as the Chichagof Mining District, the old mines and prospects in the Sitka area quickly faded from public view. Although some attempts were made to develop the old prospects of the Silver Bay area prior to World War Two, none of these attempts were well funded or successful (Hunter, 2006). Shortly after the United States became involved in World War Two, the gold mining industry in the entire country suffered a blow from which many mines never recovered. The insatiable demand for metals to fight World War Two caused the federal government to issue Executive Order L-208 in October, 1942. This order forced closure of all non-essential mining operations in the United States, including lode and placer gold production in far off Alaska Territory. By the time L-208 was lifted in 1945, most of the personnel and equipment required to run Alaska's lode gold mines had long since left the country, making re-opening these mines virtually impossible. In addition, post-War inflation in Alaska was rampant as the territory moved from a natural resource-based economy to a government-military dominated economy. With the gold price fixed at $35 per ounce, virtually none of the once profitable mines in Alaska came back into production.

Except for large gold dredging operations in a few districts, Alaska's gold mining industry remained virtually dormant during the period 1945 through 1980. Alaska's gold production fell steadily, from over 487,000 ounces in 1942 to a low of only 8,639 ounces in 1972 (AMA, 2011). Gold prices and production rose slowly as the country went off the gold standard and then increased dramatically in 1981 after the gold prices spiked in late 1980. Like many other gold district in Alaska, the Chichagof Mining District looked well placed for a revival in the 1980's however the district was now surrounded by the West Chichagof - Yakobi Wilderness, making mineral development extremely difficult. The only serious attempt to bring the Chichagof area back to life came from Vancouver-based Gold Sitka Resources who acquired an interest in the area in 1986 and over the next few years conducted a limited amount of drilling and underground development work (Drummond, 1989). Following a fire in 1988 that destroyed their camp, exploration and development activities were halted and never resumed (Berg and Grybeck, 2005).

The Silver Bay area near Sitka is located on multiple-use U.S. Forest Service (USFS) lands open to mineral entry and was not (and currently is not) encumbered by the Wilderness status that encumbers development in the Chichagof area. Unfortunately, two mining ventures conducted on USFS and/or private lands in Southeast Alaska soured the entire mining industry on exploration and development in this region. Beginning in 1986, Echo Bay Mines conducted extensive exploration and development at the Alaska Juneau (AJ) mine, Alaska's largest past producer (3.5 million ounces of gold, 1.9 million ounces of silver and 40.2 million pounds of lead, Barnett and Miller, 2003). In 1997, after a contentious 10-year effort to bring the project to production, and expenditures in excess of $77 million, Echo Bay terminated their efforts at AJ. Official reasons behind the project termination are related to their most recent feasibility study however, numerous feasibility study rewrites and extensive mine plan modifications due to

contentious social and environmental issues plagued the project from inception. The company left over 5 million ounces of gold in the ground and spent an additional $20 million reclaiming the project and permanently sealing up the underground workings. The negative effect this closure had on the mining industry worldwide can not be over-stated and the whole of Southeast Alaska was tarred with the same brush.

Shortly before the AJ closure, Coeur d'Alene Mines acquired the Kensington mine project on USFS lands in the Berners Bay area. Starting in 1995, the company embarked on a 15 year effort to bring the Kensington gold mine into production. Their efforts included numerous law suites, mining plan modifications and environmental studies that culminated in a legal dispute that took them to the U.S. Supreme Court before they were allowed to complete mine construction and begin production in 2010. Over $330 million were spent on the project before winning their Supreme Court case. Coeur d'Alene's commitment to Kensington went beyond what most mining companies would have endured. As with the AJ project, the negative effect Coeur's long battle had on the mining industry worldwide has affected all USFS lands in Southeast Alaska.

In summary, the history of mineral development in the Sitka area was negatively affected by a series of global and regional events stretching from the early 1870's to the present day. These negative affects include:

1. Nicholas Haley's (and other's) 20-year penchant for mining speculation and more than a few well-documented cases of outright fraud dating from the earliest days of the Sitka District.
2. The over-promotion and failure of the Stewart mine in 1880.
3. The over-promotion and failure of the Lucky Chance mine in 1890.
4. The over-promotion and failure of the Pande Basin mine in 1899.
5. Under-capitalization of all of the mining ventures in the Sitka area.
6. Under-utilization of existing exploration, development and mining technology in the Sitka area.
7. Under-utilization of experienced, trained mining professionals to manage affairs in the Sitka area.
8. The discovery of profitable gold deposits in the Chichagof District and concomitant abandonment of any remaining mining interest in the Sitka District.
9. The forced closure of gold mines and attendant loss of equipment and personnel in Alaska during World War Two.
10. Stagnation of the Alaska mining industry after World War Two because of high inflation, lack of experienced personnel and equipment and the fixed gold price.
11. The extremely negative worldwide image earned by Southeast Alaska starting in 1986 as a result of regulatory, environmental and social issues at the AJ and Kensington gold projects.

In summary, the above outlined combination of human-related and technology-related issues adversely affected development of the mineral resources in the Sitka area prior to 1900. After 1900, the Sitka area's negative reputation and a series of regional and global events insured that the Sitka area would remain unexplored and undeveloped. As the following paragraphs will show, the mineral potential of the Sitka area is substantial but has never been evaluated, leaving

opportunities for current mining interests that are seldom available in Alaska's other mining districts.

GEOLOGICAL BACKGROUND

Prior to outlining a reasonable development strategy and making specific recommendations regarding future exploration and development of mineral prospects in the Sitka Mining District, a brief background of the salient geological features in both the Sitka and Chichagof areas is presented below.

The gold prospects of the Sitka and Chichagof districts form a northwest trending belt of rocks, referred to here as the Sitka – Chichagof belt, which extends for over 80 miles from Hill Island on the north end of the belt to the south side of Lucky Chance Mountain on the south end (Plate 1). All of the significant gold prospects in this belt occur in similar host rocks to the southwest of the regional-scale Neva Strait fault, one of several northwest trending faults that are bounded by, and likely related to, the north-south trending Chatham Strait fault to the east and the Fairweather fault offshore to the west (Plate 2). Within this belt are two areas with a higher density of mineral prospects, the Silver Bay area near Sitka and the Chichagof mine area at the head of Klag Bay and Kimshan Cove. The central 30-mile segment of the belt, from Krestof and Halleck Islands just northwest of Sitka to the old Cobol mine area is sparsely populated with mineral prospects.

Virtually all of the gold prospects in the Sitka – Chichagof belt are hosted in a distinctive metamorphosed grey to black carbonaceous sandstone, siltstone and mudstone sequence known as the Sitka Graywacke (Loney and others, 1975, Plate 2). This Upper Jurassic to Lower Cretaceous age rock package is classified as a turbidite sequence, a distinctive formation of sediments deposited in a turbulent environment in a continental slope or continental rise setting. Turbidite sequences are marked by a regular pattern of rock types known as a Bouma Sequence. The classic Bouma sequence, from bottom (oldest) to top (youngest) includes 1) sands and any larger grains the turbidity current was carrying at the time of deposition. 2) parallel laminated sands, 3) cross laminated sands, 4) parallel laminated silts and 5) muds, ungraded, often bioturbated. This classic fining-upward sequence occurs as the energy in the turbidity current decreases over time. Repeated turbidity deposits occur, often marked by sandier units that scour and remove the upper portion of an older Bouma sequence. Turbidite sequences also are marked by a lack of carbonate rocks and intrusive rocks, although the latter do intrude the Sitka – Chichagof belt, particularly south of Redoubt Lake (Plate 2).

Gold mineralization within the Silver Bay area of the Sitka – Chichagof belt occurs as low sulfide gold-quartz veins hosted in turbidite sequence greywacke and argillite. The veins strike northwest and are steeply dipping to the east and west. Sulfides include pyrite, pyrrhotite, arsenopyrite, and rare galena. Geochemical results supplied by Bittenbender and others (1999) suggest low but anomalous levels of mercury in some prospects. Although the thickness of individual veins can reach 16 feet, the continuity along strike was a persistent problem in the old mines due to post-mineral faulting. Few of the mines extended beyond a few hundred feet in depth so continuity down-dip is uncertain. Gold grades were notoriously inconsistent in exposed segments of a vein making calculation of ore reserves particularly difficult. An age date of 49.4

million years was obtained from white mica in a quartz vein from the Lucky Chance mine, suggesting vein formation is related to subduction of the Kula-Farallon spreading ridge beneath the North American plate (Bittendbender and others, 1999). Four prospects within the area, the Stewart, Lucky Chance, Eureka and Cascade prospects (Plate 1), were selected as typifying gold prospects in the Silver Bay area:

1. Stewart Mine (PA012, Plate 1): This prospect hosts gold-quartz veins with sparse sulfides, usually only pyrite and arsenopyrite. Anomalous arsenic was noted even where arsenopyrite was not identified in the rocks. Other associated elements include anomalous lead and several parts per million mercury. The veins are often parallel to the bedding of the host rock which is graywacke and argillite of the Sitka Graywacke. The Stewart Mine was found in 1872 and production began in 1877. By 1879 there were 3 adits and a 10-stamp mill on the property. The adits were driven along the vein which is exposed in the underground workings for about 200 feet horizontally and 120 feet vertically. The vein is mainly quartz with inclusions of graywacke host rock; the maximum width of the vein is 16 feet and it averages about 5 to 6 feet. Wright and Wright (1905) reported that the ore averaged about $7.50 per ton in gold (about 0.36 ounce of gold per ton). DeArmond (1997) report that a 14-foot wide quartz vein exposed along 200 linear feet of drift prior to 1880 contained a 6 to 10 inch thick zone in the hanging wall of the vein that averaged $15 per ton in gold (0.73 oz/ton). A pyritic zone in the footwall of the vein contained $10 per ton in gold (0.48 oz/ton) after the pyrite was concentrated. The central core of the vein was barren (no gold).
2. Lucky Chance (PA017, Plate 1): Development work at Lucky Chance included 2 tunnels and a 10 stamp mill. The workings include: a 468-foot adit, the No. 2 Tunnel; a 45-foot adit higher on the hillside; a shaft; a glory hole at the top of a stope about 50 feet wide that extends vertically for about 80 feet; and numerous surface trenches. Average vein thickness was 3 feet. Free milling gold was present and associated with pyrite and arsenopyrite with lesser anomalous lead and mercury. Gangue minerals include calcite, siderite, sericite and chlorite. The veins are often parallel to the bedding of the host rock which is graywacke and argillite of the Sitka Graywacke. Several samples taken by Roehm (1940) along the hanging wall of the fault/vein contained 0.17 to 1.72 ounces of gold per ton. Only about 60 tons are thought to have been milled although 1200 tons was reportedly mined.
3. Eureka (PA006, Plate 2): Bittenbender and others (1999) mapped an 85-foot adit on the property and there is a second, caved adit nearby. A quartz vein near a slate-graywacke contact is exposed for about 40 feet in the adit. Historical references mention slate-hosted "stringer veins" in close proximity to diorite dikes and diorite breccia. In addition to anomalous gold and arsenic, the Eureka prospect contains anomalous copper hosted in chalcopyrite (Becker, 1898). Bittenbender and others (1999) describe two-inch wide slate-hosted sulfide-quartz veinlets from which chip channel samples ran 27.5 ppm gold, 3.2 ppm silver and 4,060 ppm arsenic.
4. Cascade (SI175, Plate 2): The rocks in the vicinity of the Cascade prospect consist of Jurassic and Triassic amphibolite and greenschist surrounded by rocks of the Jurassic and Triassic Khaz Formation which consists of graywacke, greenschist, metachert, phyllite, and minor limestone (Loney and others, 1975). Historical references mention a "shattered quartzite" cemented by quartz veinlets containing pyrrhotite,

arsenopyrite and rare chalcopyrite (Knopf, 1912). The deposit occurs along a fault between slate and quartzite. Vein dimensions ranged from 4 to 20 feet wide over a strike of approximately 300 feet.

Gold mineralization in the vicinity of the Chichagof and Hirst-Chichagof Mines is similar in many respects to that in the Silver Bay area of the belt (Plates 1 and 2). Between 1906 and 1942 the Chichagof mine produced 660,000 ounce of gold and 195,000 ounces of silver from about 600,000 tons of ore averaging 1.1 ounces of gold per ton and 0.3 ounces of silver per tonne (Berg and Grybeck, 2005). The smaller Hirst-Chichagof mined 140,000 tons of ore between 1922 and 1933 and produced 131,000 ounces of gold and 33,000 ounces of silver grading 0.94 ounces of gold per ton and 0.24 ounces of silver per tonne. Dozen of other smaller mines and prospects produced lesser amounts of gold and silver in the region between the head of Klag Bay and Kimshan Cove. Resources in place were in excess of 100,000 ounces with significant up-side potential. Land status review of this area revealed the presence of nearly 20 patented claim blocks running northwest – southeast across Doolth Mt. between Kimshan Cove and Klag Bay. The entire area is within the West Chichagof – Yakobi Wilderness which is closed to mineral entry.

The most productive part of the Chichagof area is a 6 mile square area centered on Doolth Mt. between Kimshan Cove and Klag Bay (Plate 1). The rocks in the area are Cretaceous Sitka Graywacke that consists of massive, thick-bedded, and slatey graywacke, locally interbedded with lenticular layers of recrystallized basalt (greenstone?, Johnson and Karl, 1985). The strata generally strike northwest and dip steeply southwest. No granitic plutons are exposed in the area of the main mines (Berg and Grybeck, 2005). All of the rocks are regionally metamorphosed to prehenite-pumpellyite grade, and some of the dikes are silicified near the orebodies (Reed and Coats, 1941). Two major faults, the Hirst and Chichagof faults trend northwest – southeast through the area and, along with splays from them, localized the principal orebodies, particularly where variations in strike or dip occur at the intersections of faults with folding and bedding. The gold – quartz mineralization occurs as irregular bodies whose long dimension plunges southeast. Individual ore "shoots" at the Chichagof mine range up to 15 feet wide, 1,000 feet in strike length and 1,800 along the dip. One 14-foot stope averaged 6 ounces of gold per ton, but the average ore grade for the life of the mine was 1.1 ounce of gold per ton. The underground workings extended along the Chichagof Fault for 4,800 feet in a horizontal direction and 4,300 feet vertically. Only twenty-three percent of the workings were mined. Still and Weir (1981) report that the Hirst-Chichagof mine explored the Hirst Fault for about a mile along strike, and up to 2,000 feet vertically. Accessory elements associated with gold included silver, arsenic, copper, lead and zinc. Pyrite was volumetrically the most abundant sulfide. Gangue minerals were limited to quartz and calcite.

A review of the geological models for various types of gold mineralization indicates that gold mineralization in the Sitka – Chichagof gold belt is similar to other turbidite-hosted orogenic gold deposits around the world (Brommecker and others, 2007; Goldfarb and others, 2005, McMillan, 1996, Goldfarb and others, 1997, Groves and others, 2003). Table 1 is presented here as a comparison between typical turbidite-hosted orogenic gold deposits and those characteristics identified in the Sitka – Chichagof gold belt. While some deposit characteristics are shared by several ore deposit model types, the key characteristics that separate turbidite-hosted orogenic gold deposits from other types of gold deposits are all present in the

Sitka – Chichagof gold belt. Those primary diagnostic characteristics include host rock type and depositional setting, vein textures, vein continuity and morphology, primary and secondary sulfides, wallrock alteration, structural controls, fluid chemistry, gold fineness, depth of emplacement and tectonic regime.

To put this classification of the Sitka – Chichagof gold belt into perspective and demonstrate why such deposits are much sought after by the mining industry, a summary of significant turbidite-hosted orogenic gold deposits is presented in Table 2. Orogenic gold deposits have been mined on several continents for the last 100 years however the defining characteristics of these deposits and the chemical and physical reasons they form have only recently been defined. Some of these deposits rank with the largest gold deposits on earth in terms of total gold content. For example, Muruntau was placed into production in the early 1960's and has produced over one million ounces of gold per year every year since then. It is currently extracting gold at a rate in excess of 1.5 million ounces per year from quartz veins in turbidite host rocks.

The Bendigo goldfield was discovered in 1851 and mined continuously until 1954, during which time over 22 million ounces of gold were recovered. The area hosts over 5,000 mining shafts, 67 of which exceeded 2,000 feet deep and 11 of which were over 3,300 feet deep. The deepest of the shafts at Bendigo was the Victoria Quartz shaft which reached 4,613 feet deep and remained mineralized to at least that depth. These ultra-deep mines were all located along the crests of anticlines (folds) where irregular-shaped gold ore bodies, referred to as "saddle reefs" because of their saddle-like shape, occurred in stacked fashion, one on top of the next. The district currently is being explored by several companies looking at possible open pit and underground mining targets.

Russia's infamous Sukhoi Log deposit also formed in irregular, bedding-plane parallel veins along an anticlinal structure. The +33 million ounce resource does not crop out at the surface but was discovered by drilling below surface outcrops of small, relatively uninspiring gold quartz veins. The deposit remains "infamous" and unmined because it has been tied up in litigation and corporate intrigue since the fall of the Soviet Union. The Russian government has not yet decided who should be allowed to mine it.

Table 1: Comparison of geological features between the Sitka - Chichagof gold belt and typical turbidite-hosted orogenic gold deposits. Data from sources cited in text.

Characteristic	**Sitka - Chichagof Gold Belt**	**Typical Turbidite Gold Deposit**
Host Rocks	Carbonaceous Graywacke	Carbonaceous Graywacke
Intrusive Types	Rare to absent	Rare to absent
Intrusive Ages	42 - 52 Ma	Arching to Tertiary
Metamorphic Grades	Low Greenschist	Greenschist to amphibolite
Proximal Alteration	Quartz and carbonate	Quartz, sericite, carbonate +/- tourmaline
Distal Alteration	Unknown	Ankerite-siderite haloes
Graphite/Carbon Role	Present, unknown significance	Present, unknown significance
Vein Texture/Structure	Sharp walls, host partings	Sharp walls, host partings
Wallrock Alteration	Carb proximal	Ser-Carb proximal
Placer Gold Size and Fineness	Insignificant, silver-bearing	Variably present, silver-bearing
Lode Gold Fineness	818 Au, 172 Ag	Generally >900 Au
Gold:Silver Ratio	4.75:1	Generally >5:1
Sulfide Volume	1-5%	Averages 2.5%
Primary Sulfides	Py>>aspy>>po>>cpy	Py>>aspy>>po>>cpy
Secondary Sulfides	Gal-spl-Hg	Gal-spl-mo-bis-stib-sulphosalts
Arsenic Mineralization	Pervasive	Pervasive
Copper Mineralization	Sporadic	Sporadic
Mercury Mineralization	Pervasive but low	Inconsistent
Fluid Chemistry	2.5% CO2, 6% NaCl	5% CO2, Low salinity
Sulfur Isotopes	0 per mil	Variable, not diagnostic
Temperature and Pressure	225-250C, 1 kb	220-600C, 0.5 - 45. kb
Age of Mineralization	42 Ma white mica	Archaean to Tertiary
Tectonic Regime	Convergent plate margin	Continental margin/back arc basin
Deposit Form	Irregular veins, shears	Irregular veins, shears, saddle reefs
Faults Controls	Regional and deposit scale	Regional and deposit scale
Fold Controls	Uncertain but suspect	Fold hinges are important control
Permeability Controls	Unknown	Variable but significant
High Angle Faults	Reverse faults common	Reverse faults common
Low Angle Normal Faults	Common, secondary	Common, secondary
Thrust Faults	Unknown	Important in some deposits
Depth of Formation	3 kilometers	1.5 to 13.5 kilometers
Geophysics - Mag - EM	Unknown	Not diagnostic
Geophysics - Radiometric	Unknown	Not diagnostic
Geophysics - Gravimetric	Unknown	Correlative with gold minz where tested
Placer Production	Insignificant	Variable, can be significant
Lode Production	>800,000 oz Au	> 50 Moz
Lode Resources	<200,000 oz	100,000 to >175 million oz
Average Gold Grade	Approx. 1 opt	0.1 to >1 opt

Centerra Gold currently is mining the Kumtor deposit in Kyrgyzstan at a rate of about 600,000 ounces of gold per year on a gold deposit with total resources in excess of 18 million ounces of gold. This deposit is controlled by low angle reverse faults in the 1,200 mile-long Tien Shan fold and thrust belt, the same accretionary belt that hosts Muruntau and seven other gold deposits with resources ranging from 1 to 11 million ounces of gold.

The closest analog to the Sitka – Chichagof gold belt is the nearby Juneau gold belt, parallel to, and 75 miles northeast of, the Sitka – Chichagof gold belt. Total production from this district was about 7 million ounces of gold and 3 million ounces of silver. Total resources in place when Echo Bay terminated activities in 1997 were in excess of 5.2 million ounces of gold. Mineralization was controlled by the Coast megashear, a 100 mile-long northwest trending shear zone extending from Windham Bay to Berners Bay. At the Alaska Juneau mine alone there were 93.7 miles of underground workings on 15 levels that extend over 3,800 feet vertically. As with mineralization at the Chichagof mine, the bottom of the mineralized zone was never found. Age dates of the two belts are similar but the few reliable age dates from the Sitka – Chichagof gold belt are generally younger, at 40-50 million years, than those of the Juneau gold belt (average 54-56 million years).

It is clear from the above discussion that turbidite-hosted orogenic gold deposits are some of the largest and most sought-after gold deposits in the world. While there is no guarantee that the Sitka – Chichagof gold belt hosts a significant deposit of this type, none of the past exploration, development or production was designed to test this ore deposit model. Furthermore, nothing in the geologic data available to the authors precludes the possible presence of such an ore deposit in the Sitka – Chichagof gold belt and much of the data presented in Table 1 suggests that the Sitka – Chichagof gold belt is prospective for turbidite-hosted orogenic gold deposits.

Table 2: Summary of significant turbidite-hosted orogenic gold deposits. Data from sources cited in text. The abbreviation "moz" means "million ounces".

Deposit	Location	Host Rock	Host Rock Age	Structural Setting	Gold Age	Ounces of Gold
Muruntau	Uzbekistan	sltstn-shale	Ordovician	Orogenic/Accretionary	Carbonif	175 moz
Bakirchik	Kazakstan	sltstn-carb	Permian(?)	Orogenic/Accretionary	Jurassic	8 moz
Olympiada	Russia	metased-carb	Proterozoic	Orogenic/Accretionary	Unknown	8 moz
Kumtor	Kyrghystan	shale-sltstn	Cambrian	Orogenic/Accretionary	Carbonif	18 moz
Natalka	Russia	shale-wacke	Permo-Triassic	Orogenic/Accretionary	Cretaceous	>10 moz
Nesdaninskoe	Russia	shale	Permian	Orogenic/Accretionary	Cretaceous	10 moz
Sukhoi Log	Russia	shale-carb	Proterozoic	Orogenic/Accretionary	Unknown	>33 moz
Otago Belt	New Zealand	shale-wacke	Permo-Triassic	Orogenic/Accretionary	Cretaceous	5 moz
Bendigo	Australia	shale-sltstn	ordovician	Orogenic/Accretionary	Sil/Dev	>22 moz
Juneau Belt	Alaska	shale-wacke	Triassic	Orogenic/Accretionary	Eocene	>12 moz
Sitka-Chichagof Belt	Alaska	shale-wacke	Eocene	Orogenic/Accretionary	Eocene	?

FUTURE DEVELOPMENT STRATEGY

Given the remarkable number of similarities between the typical turbidite-hosted orogenic gold deposit and the gold mineralization in the Sitka – Chichagof gold belt, it is surprising that exploration geologists have not targeted this belt for exploration in the past 30 years. The only deposit model research published on the belt in that period is from Goldfarb and others (1997) but their information is limited to the Chichagof mine area only and even then, the data available are largely of pre-World War Two age. At present, the limited amount of data available on prospects in the southern half of the belt, in combination with the checkered history of the Silver Bay area, present significant challenges to attracting future exploration and development capital to the Sitka area. A clear and concise treatment of these limitations and the opportunities they afford the mineral industry, is needed in order to attract mining interests to the Sitka – Chichagof gold belt. The following discussion points, while not exhaustive, should be central to any public communications planned by SEDA:

1. Pre-1900 speculation: The Silver Bay area of the belt suffered from three significant mining debacles prior to 1900, the Stewart mine, the Lucky Chance mine and the Pande Basin mine. There is a distinct possibility that fraud was involved in all three ventures. These issues cast a shadow over the district at a time when capital for mineral exploration was readily available. Although records are scarce, there is little evidence that reputable firms or investors took any interest in the Silver Bay area prior to 1900. This lack of capital and technical expertise left the field open for rampant mining speculation and the formation of under-capitalized ventures managed by mining neophytes. The results were predictably disastrous. The positive side of this story is that no significant gold ore bodies were found in the Silver Bay area, leaving increased chances of finding a significant gold ore body in the present.
2. Mining Law Encumbrances: Although they could not have known it at the time, early prospectors and speculators limited their own potential to define, mine and expand a profitable ore body by virtue of the customary process of claim staking prior to 1872 and by the statutory requirements of the still-operant Mining Law of 1872. Both before and for nearly a century this law went into effect, prospectors staked only a limited number of claims as sole owner or in conjunction with others individuals or corporations. The strict legal requirements of discovery and extralateral rights as well as case law often referred to as the "Prudent Man Rule" prevented the staking of larger claim blocks that current mining operations require. The type of turbidite-hosted orogenic gold deposits of merit world-wide often have extremely large "foot prints", often measured in square miles. The prospectors of the late 19th and early 20th centuries could not have covered such deposits with only a few 1500 foot by 600 foot Federal mining claims. Since prospectors and operators jealously guarded the information learned on their own claims, there was little chance that anyone had access to enough information to recognize the signature of a larger orebody. Mining case law has largely eliminated the constraints on staking of Federal mining claims so large claims block, which can reach into the thousands of claims, can now be staked, thereby making it possible for a single entity to identify and cover a large orebody.

3. Technological Advances: The mineral exploration and development technologies employed in the Silver Bay area during the pre-1900 time frame were vastly inferior to those available just a few decades later and they appear positively medieval in comparison to exploration and development technologies currently available to the mineral industry. For example, there is no indication that diamond core drilling was ever employed in the Silver Bay area. Limited diamond drilling was employed at the Chichagof and Hirst-Chichagof mines to help locate and define the rich but irregularly shaped gold-bearing veins. This technology no doubted helped these mines become two of the most successful gold mines in Alaska's history. In the Silver Bay region, a significant surface outcrop had to be followed underground, using hand-steel mining methods, a slow, arduous and expensive process that leaves the miner no idea where to go when the irregular veins inevitably pinch out or are cut off by post-mineral faults. Likewise, geochemical sampling methods were crude at best in the pre-1900 era whereas modern geochemical techniques would likely detect the numerous gold veins in the Silver Bay area, primarily by the elevated arsenic and other pathfinder elements that occur with mineralization. Mineral beneficiation and processing expertise also was lacking in the Silver Bay area. This deficiency is exemplified by the purchase of a chlorination circuit for the Stewart mine where there is no evidence that such recovery technology was applicable. Another tool with exploration applications to turbidite-hosted orogenic gold systems, particularly in the largely forested Silver Bay – Chichagof gold belt, is airborne gravimetric surveys. Bierlein and others (2006) determined that gravity gradients show a clear association to faults that host gold deposits in the prolific Yilgarn Craton of Western Australia. Such technology has been developed and become affordable only in the last 15 years.
4. Role of Placer Deposits: In many other gold district in North America, the presence of placer gold is the first indication of lode gold mineralization in the surrounding hills. While placer gold was the first gold found in the Silver Bay area and gold-bearing quartz was found in a creek at what became the Chichagof mine, there has been no recorded placer gold production from the Sitka – Chichagof gold belt (Alaska Miners Association, 2011). While speculation and fraud had their negative effect on the placer mining industry in the Silver Bay area, the primary reason for the lack of significant placer gold deposits is recent glaciation that scoured southeast Alaska until about 10,000 years ago. Glacial action tends to homogenize placer gold accumulations, thereby rendering them of too low a grade to mine commercially. So placer mining did not generate new capital that could be reinvested in lode mining, a business investment model that worked in many other mining districts in Alaska, such as the Fairbanks and Juneau Mining Districts.
5. Erosional Serendipity: Although the mining speculation and fraud issues that plagued the Sitka area prior to 1900 could have masked the presence of a laterally and vertically continuous ore body, its is more likely that the vagaries of erosion played a significant role in turning the Chichagof area into a productive mining area while the Silver Bay area failed to reach that status. Mine maps of both the Chichagof and Hirst Chichagof mines indicate that surface erosion on the flanks of Doolth Mt. had exposed only three quartz vein systems are surface: the Chichagof and Golden Gate shoots at the Chichagof mine and the No 1 shoot at the Hirst-Chichagof mine. The l No 1 shoot at the Hirst-Chichagof mine was in fact too low grade to be profitably mined at surface (Reed and Coats, 1941). These outcrops turned out to be the upper

parts of vertically elongated ore bodies that continued for at least 1,000 feet into the ground and which were well mineralized over that distance. If these rich and vertically extensive ore shoots had not cropped out at the present erosional surface, it is likely the Chichagof area would not have been developed to the degree it was and, like the 33 million ounce Sukhoi Log deposit, the mineralization would have remained unknown and unmined. Likewise, there is no information available to the author that precludes such vertically extensive mineralization from occurring in the Silver Bay area beneath apparently low grade or barren quartz vein outcroppings.

6. Depression-era Discoveries: Although the Great Depression brought financial chaos to many industries in the United States, the gold mining industry was not one of them. Because an individual could earn a good living panning gold from the creeks and hills throughout Alaska and this gold represented new wealth to the markets, gold exploration and mining boomed in Alaska from 1930 until Limitation Order L-208 forced an end to the gold "bull market" in 1942. In most other mining districts in Alaska, the Depression years saw numerous new mineral discoveries and witnessed the rebirth of many mines shut down during or after World War One. Nothing like this happened in the Silver Bay area, most likely because of the area's pre-1900 reputation for mining speculation and fraud and the erosional effects described above. While investment capital and technical expertise were imported to many parts of Alaska during the Depression, only the Edgecumbe Exploration Company, incorporated during the Depression, attempted to do any significant work in the Silver Bay area and most of its efforts and funds were spent on infrastructure.
7. Gold Doldrums of 1945 to 1980: At the end of World War Two the rising costs of labor, materials and services combined with the fixed price of gold ($35/oz) made gold mining less and less profitable. The large gold dredges continued to be profitable into the late 1950's and early 1960's but other than those large placer mining operations, gold mining and exploration decreased dramatically over what it was before World War Two. The entire Sitka – Chichagof gold belt suffered through this same period with even the large and profitable Chichagof mine unable to buck the economic trend. To make matters worse, virtually none of the people who worked in the Silver Bay area prior to 1900 lived to see the end of the gold doldrums, eliminating any possibility of their experience being put to use to help find new gold mineralization.
8. ANILCA to Present: The Alaska National Interest Lands Conservation Act was signed into law in 1980 but the threat of this law preceded its signing by over a decade, casting an ever darkening cloud over land availability and the regulatory regime under which an Alaska mine would operate. In addition, the $100 million AJ mine failure and the painful but successful permitting of the Kensington mine only exacerbated the mining industry's mistrust and dislike of southeast Alaska. With excellent mineral potential and lower operating costs beckoning from Asia, Africa and South America, the North American mining industry fled from southeast Alaska in the 1980's and 1990's and have not returned.

CONCLUSIONS AND RECOMMENDATIONS

Although the Sitka Mining District was the site of some of the earliest lode gold mining in Alaska, its early history of mining speculation and fraud combined with under-capitalized and poorly managed development, quickly relegated the district to second class status. The small size of mining claim blocks further hampered advancement of the district. With the rapid rise in development and production in the Juneau Mining District in the late 1800's and the Chichagof area in the early 1900's, little interest remained in the Silver Bay area of the district.

As if the above human-induced issues were not enough to hinder mining development in the Silver Bay area, several technological limitations served to thwart mine development during the late 1800's, the only period when significant funds were actually spent in the Silver Bay area. The lack of diamond drilling technology to probe beyond prospective areas at depth without the expense and time involved in driving underground workings was key among the technological handicaps suffered by the Silver Bay area. Lack of experienced mining engineers, milling men and competent miners also eliminated their expertise from being employed in the Silver Bay area of the district. Indirect detection methods, such as geochemistry and geophysics, developed in the early to mid-1900's also were not available to help prospectors and miners determine where significant ore bodies might be located.

Perhaps most importantly, the Sitka – Chichagof gold belt did not undergo multiple revivals after 1900 as did most other mining districts in North America. In particular the pre-World War One, Depression and post-1980 periods saw high levels of mineral exploration, development and production, particularly for the gold mining industry. The Sitka – Chichagof gold belt was idle during all of these periods of increased mineral development.

The geological characteristics of the Sitka – Chichagof gold belt are remarkably similar to those identified in turbidite-hosted orogenic gold deposits around the world. Nearby examples include the adjacent Juneau Gold Belt and the Chichagof and Hirst-Chichagof mines on the north end of the Sitka – Chichagof gold belt. This ore deposit model has been defined only within the last 20 years so there has been no substantive exploration of the Sitka – Chichagof gold belt targeting the diagnostic exploration parameters found in turbidite-hosted orogenic gold deposits.

Based on the author's preliminary evaluations of the Sitka – Chichagof gold belt, the following recommendations are warranted:

1. SEDA should determine the general climate for mineral development in the Sitka area. The degree of acceptability of mineral development varies widely across Alaska. Should SEDA determine that significant mineral development is not largely opposed, it should proceed with recommendations 2 through 5 below.
2. SEDA should research and prepare a summary report, designed to have all or portions thereof released to the public domain. This report should summarize the precious metal potential of the Sitka area and should be designed to encourage mining interests to evaluate this part of Alaska.
3. SEDA should restrict its promotional interest to USFS and State lands that are open to mineral entry.

4. If possible, SEDA should direct its initial promotional efforts at a targeted group of major and intermediate mining companies with the technical expertise, experience and balance sheet that will be required to define, develop and operate a significant gold deposit in this part of the world.
5. Since mining concerns prefer mining on State lands over Federal lands, SEDA should determine the State's selection priority status for State-selected lands in the Sitka area and lobby the State for expedited Tentative Approval of those lands.

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STATEMENT OF QUALIFICATIONS

CURTIS J. FREEMAN
Avalon Development Corporation
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I, CURTIS J. FREEMAN, Certified Professional Geologist #6901, HEREBY CERTIFY THAT:

I am currently employed as President of Avalon Development Corporation, P.O. Box 80268, Fairbanks, Alaska, 99708, USA.

2. I am a graduate of the College of Wooster, Ohio, with a B.A. degree in Geology (1978). I am also a graduate of the University of Alaska with an M.S. degree in Economic Geology (1980).

3. I am a Licensed Geologist in the State of Alaska (AA#159) and I am a member of the American Institute of Professional Geologists (CPG#6901), the Society of Economic Geologists, the Geological Society of Nevada, the Alaska Miners Assoc., the Association for Mineral Exploration of British Columbia and the Prospectors and Developers Assoc. of Canada.

4. From 1980 to the present I have been actively employed in various capacities in the mining industry in numerous locations in North America, Central America, South America, New Zealand and Africa.

5. I have read the definition of "Qualified Person" set out in Canadian National Instrument 43-101 (NI43-101) and certify that, by reason of my education, affiliation with a professional organization (as defined by NI43-101) and past relevant work experience, I fulfill the requirements to be a "Qualified Person" for the purposes of NI43-101.

6. I am responsible for preparations of all sections of the report entitled *Preliminary Report on the Mineral Prospectivity of the Sitka Region, Southeastern Alaska,* and dated April 24, 2012. (the "Technical Report").

7. Other than the work completed for Golden Sitka Resources in 1988 and a regional mineral summary completed for Shee Atika Group in 2004 and 2005, I have not had prior involvement with the property that is the subject of the Technical Report.

8. I am not aware of any material fact or material change with respect to the subject matter of this Technical Report that is not reflected in the Technical Report, the omission to disclose which would make the Technical Report misleading. As of the date of this certificate, to the best of the qualified person's 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.

9. I am independent of the issuer applying all of the tests in section 1.4 of NI43-101. I own no interest in any company or entity that owns or controls an interest in the properties which comprise the subject project.

10. I have read NI43-101 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 the publication by them, including publication of the Technical Report in the public company files on their websites accessible by the public.

DATED in Fairbanks, Alaska this 24th day of April, 2012.

Curtis J. Freeman, BA, MS, CPG#6901, AA#159

RESOLUTION 13-01

RESOLUTION OF THE SITKA ECONOMIC DEVELOPMENT ASSOCIATION SUPPORTING A GEOCHEMICAL SURVEY OF THE ROAD TO GREEN LAKE AS PROPOSED BY AVALON DEVELOPMENT CORPORATION AND REQUESTING THE CITY AND BOROUGH OF SITKA PROVIDE A PORTION OF THE FUNDING FOR THIS SERVICE.

WHEREAS, the mission of the Sitka Economic Development Association (SEDA) is to *"help promote the creation of family wage jobs and enhance the quality of life for Sitkans;"* and

WHEREAS, mining of the type that might be developed along the road to Green Lake would provide high paying jobs for residents and significant property tax revenues to the City and Borough of Sitka, as exemplified by operations of the Kensington Mine in Juneau; and

WHEREAS, the first attempt at lode gold mining in Alaska was made in the area being proposed for initial geochemical mineral sampling; and

WHEREAS, while historical attempts to mine the area proved unprofitable, new technologies are available that could make a lode gold mining operation viable; and

WHEREAS, it can take twenty years or more to bring a lode gold mine into operation due to the numerous permits, design and environmental mitigation planning required; and

WHEREAS, Avalon Development Corporation has extensive experience in conducting geochemical sampling, mineral surveys and assisting in mine development; and

WHEREAS, public participants at the 2013 Sitka Economic Summit selected exploring mining potential along the road to Green Lake as one of the top three priorities for action; and

WHEREAS, the CBS owns the property along the road to Green Lake that is the location for proposed geochemical sampling; and

WHEREAS, the initial mineral exploration, as proposed, is restricted to geochemical sampling of surface rock and soil and does not involve drilling, trenching or any other activity that would require federal or state permits; and

WHEREAS, Avalon Development Corporation requires advance booking of its services; and

WHEREAS, at their meeting of May 2, 2013, the SEDA Board unanimously approved a motion to request that the City and Borough of Sitka provide a portion of the funding for the initial mineral survey of the road to Green Lake as proposed by Avalon Development Corporation; and

WHEREAS, the cost estimate for the proposed geochemical sampling is $72,237; NOW THEREFORE LET IT BE

RESOLVED, that the Sitka Economic Development Association hereby supports the proposal made by Avalon Development Corporation, dated April 9, 2013 and requests consideration by the Assembly of the City and Borough of Sitka to approve the proposal and to allow Avalon Development Corporation access to the property described; and FURTHER

RESOLVED, that SEDA also requests that the CBS provide a portion of the funding to cover the estimated cost of the geochemical sampling.

CERTIFICATION

I hereby certify that the foregoing resolution was adopted by the Sitka Economic Development Association by a majority vote of the Board of Directors held on June 3, 2013.

Dated this _____ day of _____, 2013.

_____
Richard Riggs, President

Attested by:

_____
Nancy Davis, Secretary