EMGOLD MINING CORPORATION
IDAHO-MARYLAND MINING CORPORATION
1400 – 570 Granville Street
Vancouver, B.C. Canada V6C 3P1
Tel: (604) 687-4622 Fax: (604) 687-4212
Toll free: 1-888-267-1400 email: info@emgold.com

EMR-TSX VENTURE

04046527

December 3, 2004

RECEIVED
DEC 06 2004
152 SECTION

VIA FEDERAL EXPRESS

United States Securities and Exchange Commission
Office of International Corporate Finance
450 5th Street, N.W.
Judiciary Plaza
Washington, D.C. U.S.A. 20549

SUPPL

Dear Sirs/Mesdames:

Re: **Emgold Mining Corporation** (the "Company")
Rule 12(g)3-2(b) Exemptions – File #82-3003

Under the United States Securities Exchange Act of 1934

Please find enclosed for 12(g) Exemption status the documents required to be filed with the British Columbia Securities Commission and the TSX Venture Exchange. Please note that the Company is a foreign issuer and its securities are neither traded in the United States nor quoted on NASDAQ.

We trust that the information included in this package is complete. However, should you have any questions regarding the foregoing, please do not hesitate to contact the writer.

Sincerely,

EMGOLD MINING CORPORATION

Shannon Ross

PROCESSED
DEC 10 2004
THOMSON
FINANCIAL

Shannon Ross
Corporate Secretary & CFO

Enclosure

United States Sec Filing
December 3, 2004

Emgold Mining Corporation
12(g)3-2(b) Exemption Application
Schedule "A"

PART I – Documents *Required to be Made Public* pursuant to the laws of the Province of British Columbia and the TSX Venture Exchange in connection with:

News Releases

1. Emgold Receives Preliminary Assessment Technical Report for the Further Development of the Idaho-Maryland Project – November 23, 2004.
2. Emgold - Third Quarter Report – November 26, 2004.

Correspondence with Securities Commission(s)

3. Interim unaudited consolidated financial statements and MD&A for period ended September 30, 2004 and 2003.
4. Prelimanary Assessment Technical Report dated November 22, 2004.

EMGOLD MINING CORPORATION

Suite 1400 – 570 Granville Street
Vancouver, B.C. V6C 3P1
www.emgold.com

November 23, 2004

TSX Venture Exchange Symbol: **EMR**
SEC 12g3-2(b): 82-3003

EMGOLD RECEIVES PRELIMINARY ASSESSMENT TECHNICAL REPORT FOR THE FURTHER DEVELOPMENT OF THE IDAHO-MARYLAND PROJECT

Emgold Mining Corporation (EMR-TSX-V) ("Emgold") is pleased to report that it has received a Preliminary Assessment Technical Report ("Preliminary Assessment") for its Idaho-Maryland Project located in Grass Valley, California. The report identifies the requirements for staged development of the Idaho-Maryland and includes estimated capital and operating costs for production of high quality ceramic building materials using the Ceramex ™ technology. The strategy presented in the report also contemplates the completion of a large underground gold exploration program leading to a feasibility study that may define an economic gold resource at the Idaho Maryland Mine. The NI 43-101 Technical Report was prepared by AMEC Americas Limited ("AMEC") using Measured, Indicated and Inferred Mineral Resources from the Idaho-Maryland Mine.

The Preliminary Assessment describes the staged development of the Idaho-Maryland to process 1,200 to 2,400 tons per day ('tons/d') to produce from 160 million to 320 million equivalent square feet of ceramic tile per year. A preliminary discounted cash flow (DCF) financial analysis included in the Preliminary Assessment forecasts a before-tax Internal Rate of Return (IRR) on the ceramic project of 45.8% with a Net Present Value (NPV) of US$ 1.1 billion at 10% discount rate based on an estimated project capital cost of US$ 361 million. It is projected that the production of ceramic products would start in Q4 of2008 or before.

William J. Witte, President and CEO of Emgold stated, "Emgold's management and Board of Directors are pleased with the results of the Preliminary Assessment and consider that it demonstrates the robust nature of the Company's business plan, the potential of the Ceramext™ Process and the positive potential of the Idaho-Maryland Mine. We are also very excited about the advancement of the Ceramext™ Technology and its potential applicability to other operations, sites and jurisdictions to help reduce environmental impact and assist companies to meet permitting and environmental requirements." **Important Note:** While the AMEC Preliminary Assessment is NI 43-101 compliant, please be aware that the report is at a scoping level and is not equivalent to a preliminary feasibility study or feasibility study. Although Emgold Management views the conclusions reached by AMEC in the project review as very positive, Management cautions that these conclusions should be considered speculative at this point in time because: 1) additional resource definition is necessary, 2) technical advancement and scale up of the Ceramext™ technology is required, 3) permitting is obligatory under the supervision of the regulatory authorities, 4) capital will be required in order to prepare a feasibility study and then construct a plant for commercial exploitation of the Ceramext™ technology.

Emgold is currently updating its website (www.emgold.com) to include the information contained in the Preliminary Assessment Report. Each section and appendix of the report will be available for downloading from the site. Copies of the report will also be available for review at the Company's offices in Vancouver, British Columbia and Grass Valley, California.

PERMITTING

Concurrently with the preparation of the Preliminary Assessment, Emgold, through its wholly owned subsidiary, Idaho-Maryland Mining Corporation ("IMMC") has continued to prepare the necessary documentation for submission of the Final Application to the City of Grass Valley for the required Conditional Mine Use Permit. The Company believes that it enjoys a good working relationship with the City of Grass Valley and is currently coordinating the submission of the Final Application by the end of this year.

ADVANCEMENT OF THE CERAMEXT™ PROCESS

Emgold through its wholly owned subsidiary, Golden Bear Ceramics Company is advancing the Ceramext™ Process and filing additional patents on the intellectual property. Additional testing using the Ceramext™ Process is also being conducted on a wide range of feedstock from existing resource and waste management operations with positive results.

For more information about Emgold, the Idaho-Maryland Project and the Ceramext™ Process, the Stewart, Rozan and Jazz Properties in British Columbia, please visit www.emgold.com or www.sedar.com.

William J. Witte, P.Eng.
President and Chief Executive Officer

For further information please contact:
Mark Feeney, Investor Relations
Tel: (604) 687-4622 Fax: (604) 687-4212
Email: info@emgold.com

EMGOLD MINING CORPORATION

1400 – 570 Granville Street
Vancouver, B.C. Canada V6C 3P1
www.emgold.com

November 26, 2004

Ticker Symbol: **EMR**-TSX Venture Exchange
SEC 12g3-2(b): 82-3003

EMGOLD – THIRD QUARTER REPORT

Emgold Mining Corporation (EMR:TSX Venture Exchange) announces its results for the nine months ended September 30, 2004, ("fiscal 2004"). Emgold incurred a loss of $4,424,702, or a loss per share of $0.09 in fiscal 2004, compared to a loss of $1,076,927 or a loss per share of $0.04 in the nine months ended September 30, 2003 ("fiscal 2003").

Administration costs for the nine-month period totalled $1,118,057, including $106,174 in stock-based compensation compared to $419,641 in fiscal 2003, with no stock-based compensation.

Quarterly Results

Emgold incurred a loss of $1,422,736, or a loss per share of $0.03 in the quarter, compared to a loss of $373,103 or a loss per share of $0.01 in the three months ended September 30, 2003.

Emgold has expended $135,426 on the licensing, bench-scale model acquisition, construction and testing of a pilot-scale model and related research on the Ceramext™ Process during the quarter, with a total expended to date in fiscal 2004 of $946,840.

During the quarter, Emgold expended $838,000 in exploration costs on the Idaho-Maryland Property, with a total to date in fiscal 2004 of $2,414,655. During the quarter, drilling programs and subsequent analyses were compiled and utilized in the preparation of a Preliminary Assessment Technical Report dated November 22, 2004.

Administration costs for the three months totalled $465,915 including $106,174 in stock-based compensation, compared to $125,277 in the three months ended September 30, 2003. There have been increases in most expense categories in the current quarter and in fiscal 2004 compared to the level of expenditures in fiscal 2003. These increases are directly related to the increase in the activity levels at the Idaho-Maryland Mine.

At September 30, 2004, Emgold had working capital of $2,222,602.

Note: All figures in this news release are in United States dollars unless otherwise noted.

William J. Witte, P.Eng
President and Chief Executive Officer

For further information please contact:
Mark Feeney, Investor Relations: Tel: (604) 687-4622 Fax: (604) 687-4212
Email: info@emgold.com

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November 26, 2004

VIA SEDAR

British Columbia Securities Commission
PO Box 10142
Pacific Centre, 701 West Georgia Street
Vancouver, BC V7Y 1L2

Dear Sirs:

Re: Interim Report for the Nine Months Ended September 30, 2004 and 2003

Today, Emgold Mining Corporation ("the Company") distributed its Consolidated Interim Financial Statements and MD&A for the nine months ended September 30, 2004 and 2003, to shareholders appearing on the Company's supplemental mailing list.

Yours truly,

Paralegal
for **Emgold Mining Corporation**

cc: United States Securities and Exchange Commission – 12g3-2(b) #82-3003
cc: Alberta Securities Commission
cc: Autorité des marchés financiers
cc: TSX Venture Exchange

British Columbia Securities Commission

QUARTERLY AND YEAR END REPORT

BC FORM 51-901F
(previously Form 61)

Freedom of Information and Protection of Privacy Act: The personal information requested on this form is collected under the authority of and used for the purpose of administering the *Securities Act.* Questions about the collection or use of this information can be directed to the Supervisor, Financial Reporting (604-899-6729), PO Box 10142, Pacific Centre, 701 West Georgia Street, Vancouver BC V7Y 1L2. Toll Free in British Columbia 1-800-373-5393

INSTRUCTIONS

This report must be filed by Exchange Issuers within 60 days of the end of their first, second and third fiscal quarters and within 140 days of their year end. "*Exchange Issuer*" means an issuer whose securities are listed and posted for trading on the Canadian Venture Exchange and are not listed and posted on any other exchange or quoted on a trading or quotation system in Canada. Three schedules must be attached to this report as follows:

SCHEDULE A: FINANCIAL STATEMENTS

Financial statements prepared in accordance with generally accepted accounting principles are required as follows:

For the *first, second and third financial quarters*:
Interim financial statements prepared in accordance with section 1751 of the CICA Handbook, including the following: balance sheet, income statement, statement of retained earnings, cash flow statement, and notes to the financial statements.

The periods required to be presented, consistent with CICA Handbook section 1751, are as follows:

- a balance sheet as of the end of the current interim period and a comparative balance sheet as of the end of the immediately preceding fiscal year;
- a statement of retained earnings cumulatively for the current fiscal year-to-date, with a comparative statement for the comparable year-to-date period of the immediately preceding fiscal year; and
- income statements and cash flow statements for the current interim period and cumulatively for the current fiscal year-to-date, with comparative statements for the comparable interim periods (current and year-to-date) of the immediately preceding fiscal year.

For the financial year end:
Annual audited financial statements prepared on a comparative basis.

Exchange Issuers with a fiscal year of less than or greater than 12 months should refer to National Policy No. 51 *Changes in the Ending Date of a Financial Year and in Reporting Status* for guidance.

Issuers in the development stage are directed to the guidance provided in CICA Accounting Guideline AcG-11 *Enterprises in the Development Stage* that states "enterprises in the development stage are encouraged to disclose in the income statement and in the cash flow statement cumulative balances from the inception of the development stage."

Issuers that have been involved in a reverse take-over should refer to the guidance found in BCIN #52-701 (previously NIN #91/21) with respect to such transactions including the requirement or disclosure of supplementary information regarding the legal parent's prior financial operations.

SCHEDULE B: SUPPLEMENTARY INFORMATION

The supplementary information set out below must be provided when not included in Schedule A.

1. *Analysis of expenses and deferred costs*
   Provide a breakdown of amounts presented in the financial statements for the following: deferred or expensed exploration, expensed research, deferred or expensed development, cost of sales, marketing expenses, general and administrative expenses, and any other material expenses reported in the income statement and any other material deferred costs presented in the balance sheet.

   The breakdown should separately present, at a minimum, each component that comprises 20% or more of the total amount for a material classification presented on the face of the financial statements. All other components of a material classification may be grouped together under the heading "miscellaneous" or "other" in the cost breakdown; the total for "miscellaneous" should not exceed 30% of the total for a material classification.

   Breakdowns are required for the year-to-date period only. Breakdowns are not required for comparative periods.

   Issuers in the development stage are reminded that Section 3(9)(b) of the BC Securities Commission's Rules requires a schedule or note to the financial statements containing an analysis of each of exploration, research, development and administration costs, whether expensed or deferred and if the issuer is a natural resource issuer, that analysis for each material property. Because the analysis required by Rule 3(9)(b) must be included in the financial statements, the information does not have to be repeated in Schedule B. Consistent with CICA Accounting Guidelines AcG-11, staff considers an issuer to be in the development stage when it is devoting substantially all of its efforts to establishing a new business and planned principal operations have not commenced. Further, in staff's view, the lack of significant revenues for the past two years normally indicates that an issuer is in the development stage.

2. *Related party transactions*
   Provide disclosure of all related party transactions as specified in Section 3840 of the CICA Handbook.

3. *Summary of securities issued and options granted during the period*
   Provide the following information for the year-to-date period:
   (a) summary of securities issued during the period, including date of issue, type of security (common shares, convertible debentures, etc.), type of issue (private placement, public offering, exercise of warrants, etc.) number, price, total proceeds, type of consideration (cash, property, etc.) and commission paid, and
   (b) summary of options granted during the period, including date, number, name of optionee for those options granted to insiders, generic description of other optionees (e.g. "employees",) exercise price and expiry date.

4. *Summary of securities as at the end of the reporting period*
   Provide the following information as at the end of the reporting period:
   (a) description of authorized share capital including number of shares for each class, dividend rates on preferred shares and whether or not cumulative, redemption and conversion provisions,
   (b) number and recorded value for shares issued and outstanding,
   (c) description of options, warrants and convertible securities outstanding, including number or amount, exercise or conversion price and expiry date, and any recorded value, and
   (d) number of shares in each class of shares subject to escrow or pooling agreements.

5. *List the names of the directors and officers as at the date this report is signed and filed.*

SCHEDULE C: MANAGEMENT DISCUSSION AND ANALYSIS

1. *General Instructions*
   (a) Management discussion and analysis provides management with the opportunity to discuss an issuer's business, current financial results, position and future prospects.

(b) Focus the discussion on material information, including liquidity, capital resources, known trends, commitments, events, risks or uncertainties, that is reasonably expected to have a material effect on the issuer.
(c) For an issuer with active ongoing operations the discussion should be substantive (e.g. generally two to four pages in length); for an issuer with limited operations the discussion may not be as extensive (e.g. one page).
(d) The discussion must be factual, balanced and non-promotional.
(e) Where the discussion relates to a mineral project, as defined in National Instrument 43-101 "Standards of Disclosure for Mineral Projects," the disclosure must comply with NI 43-101.

2. *Description of Business*
Provide a brief description of the issuer's business. Where an issuer is inactive and has no business, disclose these facts together with a description of any plans to reactivate and the business the issuer intends to pursue.

3. *Discussion of Operations and Financial Condition*
Provide a meaningful discussion and analysis of the issuer's operations for the current year-to-date period presented in the financial statements. Discuss the issuer's financial condition as at the date of the most recent balance sheet presented in the financial statements.

The following is a list of items that should be addressed in management's discussion and analysis of the issuer's operations and financial condition. This is not intended to be an exhaustive list of the relevant items.
(a) expenditures included in the analysis of expenses and deferred costs required under Securities Rule 3(9)(b) and Schedule B;
(b) acquisition or abandonment of resource properties material to the issuer including material terms of any acquisition or disposition;
(c) acquisition or disposition of other material capital assets including material terms of the acquisition, or disposition;
(d) material write-off or write-down of assets;
(e) transactions with related parties, disclosed in Schedule B or the notes to the financial statements;
(f) material contracts or commitments;
(g) material variances between the issuer's financial results and information previously disclosed by the issuer, (for example if the issuer does not achieve revenue and profit estimates previous released, discuss this fact and the reasons for the variance);
(h) material terms of any existing third party investor relations arrangements or contracts including:
   i. the name of the person;
   ii. the amount paid during the reporting period; and
   iii. the services provided during the reporting period;
(i) legal proceedings;
(j) contingent liabilities;
(k) default under debt or other contractual obligations;
(l) a breach of corporate, securities or other laws, or of an issuer's listing agreement with the Canadian Venture Exchange including the nature of the breach, potential ramifications and what is being done to remedy it;
(m) regulatory approval requirements for a significant transaction including whether the issuer has obtained the required approval or has applied for the approval;
(n) management changes; or
(o) special resolutions passed by shareholders.

4. *Subsequent Events*
Discuss any significant events and transactions that occurred during the time from the date of the financial statements up to the date that this report is certified by the issuer.

5. *Financings, Principal Purposes and Milestones*
(a) In a tabular format, compare any previously disclosed principal purposes from a financing to actual expenditures made during the reporting period.
(b) Explain any material variances and the impact, if any, on the issuer's ability to achieve previously disclosed objectives and milestones.

6. *Liquidity and Solvency*
Discuss the issuer's working capital position and its ability to meet its ongoing obligations as they become due.

How to File Under National Instrument 13-101 – System for Electronic Document Analysis and Retrieval (SEDAR)
BC Form 51-901F Quarterly and Year End Reports are filed under Category of Filing: Continuous Disclosure and Filing Type: Interim Financial Statements or Annual Financial Statements. Schedule A (Financial Statements) is filed under Document Type: Interim Financial Statements or Annual Financial Statements. Schedule B (Supplementary Information) and Schedule C (management Discussion) are filed under Document Type: BC Form 51-901F (previously Document Type Form 61(BC)).

Meeting the Form Requirements
BC Form 51-901F consists of three parts: Instructions to schedules A, B and C, issuer details and a certificate. To comply with National instrument 132-101 it is not necessary to reproduce the instructions that are set out in BC Form 51-901F. A cover page to the schedules titled BC Form 51-901F that includes the issuer details and certificate is all that is required to meet the BC Form 51-901F requirements. The form of the certificate should be amended so as to refer to one or two of the three schedules required to complete the report.

ISSUER DETAILS

NAME OF ISSUER	FOR QUARTER ENDED	DATE OF REPORT YY MM DD
EMGOLD MINING CORPORATION	SEP 30, 2004	2004 NOV 26

ISSUER ADDRESS				
SUITE 1400 – 570 GRANVILLE STREET				
CITY	PROVINCE	POSTAL CODE	ISSUER FAX NO.	ISSUER TELEPHONE NO.
VANCOUVER	BC	V6C 3P1	604-687 4212	604-687 4622
CONTACT NAME		CONTACT POSITION		CONTACT TELEPHONE NO.
ANDREW MACRITCHIE		CONTROLLER		604-687-4622
CONTACT EMAIL ADDRESS		WEB SITE ADDRESS		
amacritchie@langmining.com		www.sultanminerals.com		

CERTIFICATE
The three schedules required to complete this Report are attached and the disclosure contained therein has been approved by the Board of Directors. A copy of this Report will be provided to any shareholder who requests it.

DIRECTOR'S SIGNATURE	PRINT FULL NAME	DATE SIGNED YY MM DD
"SARGENT H. BERNER"	SARGENT H. BERNER	2004 NOV 26
"WILLIAM J. WITTE"	WILLIAM J. WITTE	2004 NOV 26

EMGOLD MINING CORPORATION
QUARTERLY REPORT
September 30, 2004
(Expressed in United States dollars, unless otherwise stated)

Schedule A:

See unaudited consolidated financial statements.

Schedule B:

1. **Analysis of expenses and deferred costs**

   See unaudited consolidated financial statements attached in Schedule A to the Form 51-901.

2. **Related party transactions**

   See note 6 to the unaudited consolidated financial statements for the nine months ended September 30, 2004.

3. **Summary of securities issued and options granted during the period**

   (a) Securities issued during the three months ended September 30, 2004, all in Canadian dollars

Date of Issue	Type of Security	Type of Issue	Number	Price (Cdn$)	Total Proceeds (Cdn$)	Type of Consider-ation	Commis-sion Paid (Cdn$)
August 8, 2004	Common	Property payment	50,000	0.76	38,000	Property payment	Nil
August 19, 2004	Common	Stock options	60,000	0.25	15,000	Cash	Nil
August 19, 2004	Common	Stock options	50,000	0.10	5,000	Cash	Nil
			160,000		58,000		

   (b) Options granted during the three months ended September 30, 2004, all in Canadian dollars

Date of Grant	Number	Name of Optionee	Exercise Price (Cdn$)	Expiry Date
July 12, 2004	150,000*	Sargent H. Berner	$0.90	July 12, 2014
July 12, 2004	65,000	Consultants	$0.90	July 12, 2014
July 12, 2004	220,000	IR Consultants	$0.90	July 12, 2014
July 12, 2004	445,000	Employees	$0.90	July 12, 2014
July 12, 2004	250,000*	Ross Guenther	$0.90	July 12, 2014
July 12, 2004	150,000*	Frank A. Lang	$0.90	July 12, 2014
July 12, 2004	200,000*	Shannon M. Ross	$0.90	July 12, 2014
July 12, 2004	50,000*	Arthur G. Troup	$0.90	July 12, 2014
July 12, 2004	200,000*	William J. Witte	$0.90	July 12, 2014
July 12, 2004	150,000*	John King Burns	$0.90	July 12, 2014
July 12, 2004	100,000*	Ian Chang	$0.90	July 12, 2014
July 12, 2004	150,000*	Joel D. Schneyer	$0.90	July 12, 2014
	2,130,000			

   *Directors and officers stock options are subject to disinterested shareholder approval at the next Annual General Meeting of shareholders.

4. **Summary of securities as at the end of the reporting period**

   (a) **Authorized Capital**

   500,000,000 common shares without par value.
   50,000,000 preferred shares.

(b) **Issued and Outstanding Capital at September 30, 2004**

47,158,099 common shares are issued and outstanding.

3,948,428 Series A First Preference shares.

(c) (i) **Stock Options Outstanding, all in Canadian dollars**

Number of Shares	Exercise Price (Cdn$)	Expiry Date
145,000	0.30	April 21, 2007
40,000	0.25	January 15, 2009
150,000	0.25	June 11, 2009
494,000	0.10	October 12, 2011
150,000	0.60	June 18, 2013
2,855,000	1.00	November 19, 2013
150,000	1.00	June 16, 2014
2,130,000	0.90	July 14, 2014
6,114,000		

(ii) **Warrants Outstanding, all in Canadian dollars**

Number of Shares	Exercise Price (Cdn$)	Expiry Date
6,232,799	1.00	December 22, 2005
6,232,799		

(d) **Shares in Escrow**

Nil

5. **List of directors and officers**

Frank A. Lang – Chairman and Director
William J. Witte – President, Chief Executive Officer and Director
Joel D. Schneyer - Director
Sargent H. Berner – Director
Ross Guenther – Project Manager and Director
John King Burns – Director
Ian Chang – Vice President, Project Development
Arthur G. Troup – Vice President, Exploration
Shannon M. Ross – Chief Financial Officer and Corporate Secretary

IDAHO-MARYLAND PROJECT, GRASS VALLEY, CALIFORNIA

Emgold Mining Corporation is advancing the exploration and re-development of the former Idaho-Maryland Mine located in Grass Valley, California, to return the famous gold mine to production. The Idaho-Maryland Mine was discovered in 1851, produced from 1862 through 1956 and is the second largest historical producer in California. Total recorded production was 2,383,000 ounces of gold from 5,546,000 short tons for a recovered grade of 0.43 ounces of gold per short ton.

Recent activities on the Idaho-Maryland include on-going exploration planning and resource definition, preparation of the Final Application for a Conditional Mine Use Permit and completion of a new NI 43-101 Preliminary Assessment Technical Report, as well as the further development and commercialization of the Ceramext™ Process.

Current feasibility work includes:

- project permitting,
- metallurgical test work,
- development of preliminary conceptual layouts and process flow sheets,
- advancing the Ceramext™ technology. This technology will be used to process development rock and tailings from the Idaho-Maryland Mine, producing high value added building materials, and
- increasing its land position. Emgold has also increased its surface land position in Grass Valley, California to allow for further development and permitting of the Idaho-Maryland Project.

EXPLORATION

During the quarter, twenty-six holes totalling 18,060-foot (5,486 m) of Phase 2 gold exploration drilling and approximately 3,000 feet (915 m) of geotechnical drilling were completed. The geotechnical drilling was completed to test the possible location of future exploration and production ramps and surface facilities at the Idaho-Maryland property and the suitability of the meta-volcanic rock within the Brunswick Slab using the Ceramext™ Process to produce high quality ceramic products.

Emgold has currently identified up to 26 conceptual exploration targets, each having the potential to host a sizeable gold deposit based on historical and current drill data from the Idaho-Maryland. It is important to note that these conceptual exploration targets may only be further defined by both surface and underground exploration drill programs. The Company's geologists are currently designing the Phase 3 surface drill program for 2005 and an application to conduct the Phase 3 surface drill program will be prepared for submission to the City of Grass Valley. The Phase 3 program is presently expected to consist of approximately 25,000 feet (7,620 m) of core drilling conducted up to 5 sites located within the City. We are also planning a future 425,000 ft (130,000 m) underground drill program to test the 26 conceptual exploration targets and 200 resource blocks that have currently been identified. Underground exploration can only be accomplished by successfully obtaining a Conditional Mine Use Permit, and our current estimate is that the permitting process may take between 14 and 24 months, based on the experiences of previous mining operations located in California.

PERMITTING

Permitting for the Idaho-Maryland Mine continues as we prepare the necessary documentation for submission of the Final Application for the required Conditional Mine Use Permit ("CMUP"). In July 2004 we submitted a Conceptual Application to the City of Grass Valley and Nevada County for preliminary review and comment from appropriate government agencies prior to submission of the Final Application. In September 2004, the Idaho-Maryland Mining Corporation ("IMMC") received comments from the various government agencies on the Conceptual Application and is using this valuable input for the preparation of the Final Application. Permitting is a well-defined process, where we work with the local community and governments. We believe we have a good working relationship with the local community and governments and to date have been successful in obtaining permits we have applied for.

The CMUP will include, but not necessarily be limited to, the dewatering of the existing Idaho-Maryland Mine workings and the construction of a ramp for underground exploration and possible future mine production. The construction of the decline may also enable the production of ceramics from the development rock and further testing of underground exploration targets that are not accessible by surface exploration. The CMUP application will also include provisions for Emgold to operate a Ceramext™ plant to produce ceramic building products, sales of which are projected to contribute significant revenue that could reduce the cost of the complete mining operation. The CMUP application contemplates the development of a staged gold mining operation on a scale of up to 2,400 tons per day after positive feasibility studies are completed and production decisions can be made.

ADVANCEMENT OF THE CERAMEXT™ PROCESS

Emgold through its wholly owned subsidiary, Golden Bear Ceramics Company ("Golden Bear") has successfully commissioned the Ceramext™ pilot plant located in Grass Valley, California. Soon after commissioning the pilot plant, our technical team was able to produce high quality ceramic billets suitable for further processing into a wide range of saleable ceramic products. We are primarily focused on the testing and utilization of meta-volcanic rock and tailings from the Idaho-Maryland project using the Ceramext™ Process to produce ceramic materials for both US and foreign markets. Specifically we are working to commercialize the patented Ceramext™ Process to process mine development rock and tailings from the Idaho-Maryland project into a variety of ceramic products, including ceramic floor, wall, countertop and roof tile, and ceramic brick, block and pavers.

The Ceramext™ hot extrusion process should be able to use a very wide range of siliceous feedstocks that would normally be considered waste materials. These include not only mine development rock and mine tailing materials, such as those from the Idaho-Maryland project, but also coal and lignite fly ash, incinerator and wood ash, waste earth materials, and a variety of other silicates. This process may be used to economically manufacture ceramic products with superior properties, including materials 3 to 5 times stronger than conventional ceramics that are impervious to water without glazing. The Ceramext™ Process is expected to be capable of producing high quality ceramics at approximately 30-40% less cost than other conventional ceramic processes because of its efficient use of energy.

Upon completion of the initial pilot plant testing of the Idaho-Maryland materials, we are preparing for marketing studies leading to a feasibility study for production. Emgold anticipates completing the marketing and feasibility studies using the Ceramext™ Process for the Idaho-Maryland Mine during 2005 and 2006.

PREPARATION OF A NEW NI 43-101 TECHNICAL REPORT

A National Instrument 43-101 Preliminary Assessment Technical Report ("Preliminary Assessment"), was prepared for the Idaho-Maryland Project. The report identifies the requirements for staged development of the Idaho-Maryland and includes estimated capital and operating costs for production of high quality ceramic building materials using the Ceramext™ technology. The strategy presented in the report also contemplates the completion of a large underground gold exploration program leading to a feasibility study that may define an economic gold resource at the Idaho Maryland Mine. The NI 43-101 Technical Report was prepared by AMEC Americas Limited ("AMEC") using Measured, Indicated and Inferred Mineral Resources from the Idaho-Maryland Mine.

The Preliminary Assessment describes the staged development of the Idaho-Maryland Mine to process 1,200 to 2,400 tons per day ('tons/d'), producing 160 million to 320 million equivalent square feet of ceramic tile per year.

As presented in the Preliminary Assessment, the overall development plan for the Idaho-Maryland project envisions the following three major components:

1. Development of a decline to access underground drill stations for gold exploration
2. Construction of a commercial ceramics production facility which will utilize development rock from the decline and rock from an underground room-and-pillar mine as feed material
3. Upon confirmation of an economic gold resource, establishment of a commercial gold mine and processing operation, integrated with the ceramics process so that gold process tailings and development rock would become the feedstock for the ceramic process

Successful application of the Ceramext™ technology is projected to consume mine rock and tailings from the Idaho-Maryland Mine thereby eliminating the requirement for long-term surface storage of these materials. The successful production and sales of ceramic materials would allow Idaho-Maryland to continue with exploration of additional gold targets, then pre-production development, with the objective to define an economic gold resource while generating positive cash flow from the ceramics production.

The Preliminary Assessment presents industrial minerals (ceramics feedstock) resources and gold resources for the Idaho-Maryland project. The industrial minerals resource was delineated by seven geotechnical core holes drilled at inclinations of 40° and 45°, one exploration core hole, seven surface sample sites, and certain geologic data from historical underground mine drifts. The top boundary of the resource is 200 ft (60 m) below the ground surface (due to depth of mineral rights). Drill hole spacing ranged from 80 ft to 1,200 ft (24 m to 366 m). The lower boundary of the resource is based on the bottom of the drill holes. The west boundary is where the amount of gabbro and ultramafic rocks begin to increase. The east boundary is based on the limit of geotechnical drilling and surface sampling.

The Idaho-Maryland project has measured, indicated, and inferred industrial minerals (ceramic feedstock) resources, as summarized in the following table:

Summary of Ceramics Feedstock Resources, November 5, 2004

Classification	Tons
Measured mineral resources	48,817,000
Indicated mineral resources	122,685,000
Measured + Indicated mineral resources	171,502,000
Inferred mineral resources	358,112,000

The gold resources for the Idaho-Maryland project are summarized in the following table:

Summary Idaho-Maryland Gold Mineral Resource, September 20, 2004

	True Thickness (ft)	Tonnage (ton)	Gold Grade (oz/ton)	Gold (oz)	Gold Grade (opt) 1.44 MCF	Gold (oz) 1.44 MCF[1]
Idaho-Maryland Project [3]						
Measured Mineral Resource 1	13.3	271,000	0.22	59,000	0.31	85,000
Measured Mineral Resource 2	70.7	831,000	0.15	127,000	0.15	127,000
Indicated Mineral Resource	8.1	489,000	0.35	172,000	0.50	243,000
Measured + Indicated Mineral Resources	**41.1**	**1,666,000**	**0.22**	**375,000**	**0.28**	**472,000**
Inferred Mineral Resources	9.3	2,526,000	0.26	666,000	0.38	952,000

1. MCF = Mine Call Factor (not applicable to Waterman Group resources). 2. Idaho-Maryland measured resources are split into two categories: 1. the Eureka, Idaho, Dorsey, and Brunswick Groups, and 2. the Waterman Group (stockwork/slate type ore).

Mining

The Preliminary Assessment presents an underground mine plan that has been developed to extract the industrial minerals resource at the Idaho-Maryland mine using modern mining methods and simultaneously provide access to underground gold exploration targets and known gold resources. Feed material for ceramics production would come primarily from room-and-pillar stopes located 500 ft or more below surface. The decline and ancillary development would also provide ceramic feed material. The decline has been placed such that it would provide an excellent drill platform for exploration of the known gold resources and additional exploration targets within and adjacent to the historic Idaho-Maryland workings. The ramp access would be driven as two declines separated by a 60 ft pillar. Ceramics production is scheduled to ramp up gradually from 1,200 ton/d to 2,400 ton/d over the course of three years from initial plant start up.

Ceramics Production

Ceramics manufacturing would utilize the proprietary Ceramext™ process. Based on the 1,200 ton/d feed rate, the ceramics plant could produce approximately 160 M ft^2 of tile per year. This is equivalent to approximately 5% of the U.S. market for ceramic tile in 2003 and 35% of the California market for tile in 2003. The second stage of mine development would double this production level to approximately 320 M ft^2 per year. This represents approximately 10% of the 2003 US tile consumption.

Capital Cost Estimate

The Preliminary Assessment presents a capital cost estimate for the development of the Idaho-Maryland project. The estimated capital cost for development of the mining, process, and ancillary facilities to achieve a production rate of 1,200 ton/d is $196 million, with an expansion of the mine and process plant to achieve a production rate of 2,400 ton/d at an estimated capital cost of $155 million. The total estimated mine and plant capital cost is $351 million excluding sales taxes but including contingencies, and is based on 4th quarter 2004 US dollars. This estimate should be considered as conceptual with a probable accuracy of ±35%. Separate from the ceramic mine and plant project cost, an additional $43 million has been included to complete dewatering and rehabilitation of the existing mine workings, and to perform a gold exploration program primarily in the areas of the previous Brunswick and Idaho-Maryland workings, and complete a feasibility study on the gold project. The total project capital cost including mine, plant and dewatering, rehabilitation of existing Idaho-Maryland mine workings, and gold exploration program is $394 million excluding California Sales Tax.

Project Schedule

The project schedule presented in the Preliminary Assessment consists of five distinct stages: 1) securing permits and completion of feasibility study, 2) detail engineering, 3) driving of a decline (underground rampway) to the industrial minerals mining area and development of initial mine excavation areas and exploration drill stations, 4) construction of the surface process and ancillary facilities, and 5) expansion of the mine production and surface process plant capacities.

Securing of permits and completion of a feasibility study is expected to require up to 24 months after submittal of the Conditional Mine Use Permit application. Detail engineering and development of the mine, construction of the surface plant and facilities is scheduled to require an additional 18 months. Overall, the implementation is estimated to be 36 to 42 months from submittal of the permit application to the start of production for the 1,200 ton/d project.

The expansion to 2,400 ton/d is projected to be completed 36 months after the initial start of the 1,200 ton/d processing plant.

Important Note: While the AMEC Preliminary Assessment is NI 43-101 compliant, please be aware that the report is at a scoping level and is not equivalent to a preliminary feasibility study or feasibility study. Although Emgold Management views the conclusions reached by AMEC in the project review as very positive, Management cautions that these conclusions should be considered speculative at this point in time because: 1) additional resource definition is necessary, 2) technical advancement and scale up of the Ceramext™ technology is required, 3) permitting is obligatory under the supervision of the regulatory authorities, 4) capital will be required in order to prepare a feasibility study and then construct a plant for commercial exploitation of the Ceramext™ technology.

OFFICE FACILITIES

On October 1, 2004, the Idaho-Maryland and Golden Bear project teams moved into a 45,000 square foot (4,180 square metre) facility located in Grass Valley, California. This new facility houses all Grass Valley operations including administration, geology and core storage, mining development department and the Ceramext™ Process laboratory and pilot plant operations.

JAZZ PROPERTY

In 2004, we entered into an option agreement to acquire a 100% interest in the Jazz Property consisting of twenty-four mineral claims (24 units) located at latitude 49°17'N and longitude 117°21'W in the Nelson Mining Division near Nelson, British Columbia. The property is contiguous to the Stewart Property and covers approximately 600 hectares.

A diamond drill program of approximately 600 metres was recently completed on the Craigtown Creek area of the property, and assay results are pending. Preliminary work included soil and rock chip sampling and geological mapping. Two new zones of interest were sampled during this exploration program – the Free Silver and the Craigtown Creek areas. This work followed up airborne geophysical survey results and prior exploration work.

<u>Free Silver</u>

The Free Silver area consists of a cluster of historic showings, located in the southeast portion of the property. The original Free Silver Claims were staked in 1896 and prior work on the claims consisted of small trenching programs in 1906 and 1915.

In the Free Silver area, a number of parallel to subparallel veins occur at the contact of volcanic rocks with a quartz monzonite porphyry. The veins vary from 0.1 to 3 metres wide and trend in an east-west direction and dip steeply. Mineralization varies from massive pyrite-pyrrhotite to galena with subordinate pyrite and sphalerite. Minor molybdenite is reported locally within the veins. Sylvanite can be found in calcite filled vugs in an andesite host (occurring as a xenolith in monzonite) and is associated with trace amounts of chalcopyrite and galena.

Under the agreement with the claimholder, there is a work commitment to spend Cdn$75,000 in exploration work on the Jazz Property by April 7, 2006. The current combined budget for this year's exploration program on the Stewart, Rozan and Jazz properties is approximately Cdn$120,000 of which Cdn$50,000 may be spent directly on the Jazz Property.

The Craigtown Creek area requires further exploration.

The 600 metre diamond drill program was planned and drilled under the supervision of Linda Dandy, P.Geo, of P&L Geological Services, a "Qualified Person" for the purpose of National Instrument 43-101, "Standards of Disclosure for Mineral Projects."

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITIONS AND RESULTS OF OPERATIONS

The following discussion of the financial position and operating results of the Company should be read in conjunction with the Consolidated Financial Statements and accompanying Notes for the years ended December 31, 2003 and 2002. All monetary amounts are in United States dollars unless otherwise noted.

The Management's Discussion an Analysis ("MD&A") contains certain "Forward-Looking Statements." All statements, other than statements of historical fact included herein, including without limitation, statements regarding potential mineralization and resources, research and development activities, and future plans of the Company are forward looking statements that involve various risks and uncertainties including changes in future prices of gold; variations in ore reserves, grades or recovery rates, accidents, labour disputes and other risks associated with mining; delays in obtaining governmental approvals or financing or in the completion of development or construction activities, technological obsolescence, and other factors discussed under "Risk Factors" in the MD&A for the year ended December 31, 2003.

There can be no assurance that such statements will prove to be accurate and actual results and future events could differ materially from those acknowledged in such statements. The effective date of this MD&A is November 26, 2004.

In 2003, the Company adopted the United States dollar as its functional and reporting currency.

Results of Operations

Nine Months Ended September 30, 2004, Compared to Nine Months Ended September 30, 2003

Emgold's loss for the nine months ended September 30, 2004 ("fiscal 2004") was $4,424,702, or $0.09 per share, compared to a loss of $1,076,927, or $0.04 per share for the nine months ended September 30, 2003 ("fiscal 2003"). Included in fiscal 2004 is $343,152 in stock-based compensation with no comparative stock-based compensation in fiscal 2003. Stock-based compensation affects salaries and benefits, Ceramext™ process research, exploration expenses and shareholder communications expense classifications. Cash expenses are expected to increase in the future due to the higher activity level of the Company.

During fiscal 2004 the Company earned interest income of $54,850 on excess cash balances compared to $3,333 in fiscal 2003. The increase was due to the higher cash balances held during fiscal 2004.

General and administrative expenses:

Legal, accounting and audit fees increased from $40,795 in fiscal 2003 to $75,100 in fiscal 2004. Audit fees have increased due to the conversion of the financial statements to United States dollars and due to quarterly reviews in anticipation of filing a Form 20-F with the United States Securities and Exchange Commission. These fees will likely continue to increase due to increasing regulatory and reporting requirements.

Office and administration expenses in fiscal 2004 of $145,257 compare to $28,707 in fiscal 2003. Office and administration expenses include telephone, courier, and other direct costs, which were incurred in the period. Costs are higher in the current period, as an exploration office and pilot plant facilities have been set up in Grass Valley, California. In addition, a portion of rent, telephone and other related expenses are included in exploration expenses. When costs relate directly to the Idaho-Maryland project, or the Ceramext™ process the costs are included in exploration expenses or Ceramext™ process research costs respectively.

Salaries and benefits of $318,604 in fiscal 2004 compare to $145,643 in fiscal 2003. The increase in costs in fiscal 2004 reflects the increased management, administrative and accounting time related to the processing of transactions, regulatory requirements and other salary costs related to the increased activity in the Company. Also, $31,170 in stock-based compensation is included, relating to stock options granted in July 2004, whereas no stock-based compensation was included in fiscal 2003. These values were calculated using a three-year life, a volatility of 128.05%, and a discount rate of 2.53%. The stock options vested 25% on grant, and 25% every three months thereafter. Administration activity level increases are dependent upon the Company's ability to obtain sufficient financing to carry on planned operations. Activity on the Idaho-Maryland property, Rozan, Stewart and Jazz properties increased when financing was obtained, drilling commenced and the Ceramext™ transaction was completed.

Certain consulting costs from previous quarters were reclassified to the Idaho-Maryland project in Q3 2004. Also included in management and consulting fees in fiscal 2004 is $18,685 paid to Lang Mining Corp. for the services of the Chairman of the Company. This compares to $16,054 in fiscal 2003.

Exchange losses of $132,399 in fiscal 2004 compare to losses of $10,616 in fiscal 2003. During the period, the Company's funds were held primarily in Canadian dollars. The debt portion of preference shares is also denominated in Canadian dollars. These amounts are therefore subject to exchange rate fluctuations. The Canadian dollar has been fairly volatile in relation to the United States dollar in fiscal 2004.

Shareholder communications costs of $259,292 in fiscal 2004 compare to $121,034 in fiscal 2003. During fiscal 2004, total stock-based compensation expense of $94,317 is included in shareholder communication costs compared to $nil in fiscal 2003. Further details of investor relations contracts are outlined below.

Shareholder communication costs will continue to be a significant expense due to the increased interest in the Company and the related costs of informing shareholders and potential new investors about the Company's activities. Shareholder communications costs include dissemination costs associated with news releases, transfer agent, regulatory and filing fees as well as fees associated with the maintenance of the Company's website. Investor relations contractual activities incurred in fiscal 2004 totalled $107,049 compared to $41,843 in fiscal 2003. High Visibility Public Relations, a media relations' consultant was paid $34,027 for fees and expenses in fiscal 2004 compared to $16,995 in fiscal 2003. Investor relations activities also include payments of $20,149 to Windward Communications for fees and expenses in fiscal 2004 compared to $15,065 in fiscal 2003, and payments of $31,384 for fees and expenses to Coal Harbor Communications in fiscal 2004 compared to $21,049 in fiscal 2003. Notice of termination of the Investor Relations and Marketing Agreement between the Company and Coal Harbor Communications was delivered on June 30, 2004, with such termination which became effective July 30, 2004.

The media campaign and investor relations' costs have increased shareholder communication costs substantially in order to educate the community surrounding the Idaho-Maryland Mine, the investment community and shareholders of new developments and investment opportunities. In fiscal 2004, $26,891 has been expended on advertising and investor publications compared to $24,392 in fiscal 2003.

Effective July 1, 2004, Emgold retained the Los Angeles area firm of Michael Bayback and Company, Inc. ("MBC") to conduct investor relations programs oriented towards institutional investors on behalf of the Company. The Company will pay MBC a monthly fee of US$5,000 for the one-year term of the agreement. The agreement may be terminated after the first four months and/or may be renewed after the initial term. Pursuant to the Agreement, Emgold granted 200,000 incentive stock options to a principal of MBC, exercisable at a price of $0.90 each for a period of ten years. The vested portion of this stock-based compensation was valued at $65,624 and is included in shareholder communications costs in fiscal 2004. During fiscal 2004 $15,000 in monthly fees and $3,175 in costs was paid to MBC, with no comparative expense in fiscal 2003.

The Company has also retained investor relations services through its current management service provider, LMC Management Services Ltd. ("LMC") a private company held jointly by the Company and other public companies, to provide services on a full cost recovery basis to the various public entities currently sharing office space with the Company. Since July 1, 2004, LMC provides the services of Mr. Mark Feeney, an experienced investor relations and public relations professional, on a month-to-month basis, not to exceed $5,500 per month commencing in July 2004. The Company may terminate Mr. Feeney's services at any time with 30-days written notice to LMC. The Company will pay LMC for Mr. Feeney's services from its current working capital. Mr. Feeney was granted 20,000 incentive stock options, exercisable at a price of $0.90 each for a period of ten years. The vested portion of this stock-based compensation was valued at $6,562 and is included in shareholder communications costs in fiscal 2004. During fiscal 2004, $6,416 was paid to LMC for Mr. Feeney's services, with no comparative expense in fiscal 2003.

Exploration expenses:

Exploration expenditures on the Idaho-Maryland property increased from $656,415 in fiscal 2003 to $2,348,283 in fiscal 2004. Total expenditures in fiscal 2004, with the related fiscal 2003 expenditures in brackets, are as follows: assays and analysis - $67,766 (fiscal 2003 - $8,115); consulting and engineering fees related to mine planning - $356,535 (fiscal 2003 - $113,012); geological and geochemical - $532,503 (fiscal 2003 - $204,834); site activities including ongoing evaluation of historic data and preparation of applications for permitting for the surface exploration program and drilling - $366,725 (fiscal 2003 - $127,736); drilling - $903,869 (fiscal 2003- $122,753); and transportation - $42,885 (fiscal 2003 - $18,973). The Company has a five-year lease and option to purchase the Idaho-Maryland property. The current lease commenced on June 1, 2002, and expires on May 31, 2007. Land lease and taxes in fiscal 2004 total $78,000 (fiscal 2003 - $60,992). Stock-based compensation for the vested portion of stock options granted on July 12, 2004, is included in the following expense categories in fiscal 2004: $46,757 in geological and geochemical, $31,992 in site activities, and $3,281 in mine planning. All costs increased substantially in fiscal 2004 due to the Phase 2 drilling program and an additional geotechnical program that were completed during the period.

Exploration expenditures on the Rozan, Stewart and Jazz properties totalled $66,372 in fiscal 2004 compared to $4,204 in fiscal 2003. Surface work and trenching programs were completed in fiscal 2004. Results of this work will assist in determining future work programs on the properties. Stock-based compensation expense of $9,843 is included in the total geological and geochemical expense of $46,624 in fiscal 2004, with no comparative stock-based compensation expense in fiscal 2003.

Research and development expenses:

In fiscal 2004 the Company incurred $946,840 on the research and development of the Ceramext™ Process. These costs include $168,631 spent on equipment related to the plant, $282,108 on licensing fees and acquisition of the bench-scale plant for the technology, $279,091 on consultants, contractors, and hourly labour; $84,027 on site costs; $113,427 on engineering salaries; and $19,556 on transportation. The acquisition was completed in fiscal 2004. Stock-based compensation expense for the vested portion of stock options granted in July 31, 2004, is included as follows in the following expense categories in fiscal 2004: site costs - $4,102, and engineering salaries - $40,195.

Three Months Ended September 30, 2004, Compared to Three Months Ended September 30, 2003

Emgold's loss for the three months ended September 30, 2004 ("Q3 2004") was $1,442,736, or $0.03 per share, compared to a loss of $373,103, or $0.01 per share for the three months ended September 30, 2003 ("Q3 2003").

During Q3 2004 the Company earned interest income of $16,605 on excess cash balances compared to $1,242 in Q3 2003 due to the increased but diminishing cash balances throughout Q3 2004.

General and administrative expenses:

Legal, accounting and audit fees increased from $13,892 in Q3 2003 to $43,508 in Q3 2004. Audit fees have increased due to the Company having the interim financial statements reviewed in 2004 in preparation for inclusion in a Form 20-F filing. Additional legal, audit and accounting fees will be incurred in the fourth quarter of fiscal 2004 with respect to this filing.

Office and administration expenses in Q3 2004 of $111,594 compare to $3,392 in Q3 2003. Office and administration expenses include telephone, courier, and other direct costs, which were incurred in the period.

Costs are higher in the current period primarily due to the increased activity on the projects in Grass Valley, coupled with higher communications costs between the head office in Vancouver and Grass Valley.

Salaries and benefits of $194,168 in Q3 2004 compare to $50,042 in Q3 2003. Included in Q3 2004 is $31,171 in stock-based compensation with no comparative expense in Q3 2003. The costs in Q3 2004 reflect the increased management, administrative and accounting time related to the processing of increased transactions, increased regulatory requirements and other salary costs related to the increased activity in the Company. Activity on the Idaho-Maryland property increased as financing was obtained, drilling commenced and the Ceramext LLC transaction was completed.

On a net basis, no management and consulting fees were incurred in Q3 2004; however, approximately $15,000 worth of project-related consulting fees were reclassified during the quarter. This reclassification to exploration expenses offset consulting fees incurred in the period.

Exchange gains of $49,279 in Q3 2004 compare to gains of $890 in Q3 2003. During the period, the Company's funds were held primarily in Canadian dollars. Preference shares are also denominated in Canadian dollars. These amounts are therefore subject to exchange rate fluctuations. The Canadian dollar has strengthened relative to the United States dollar in Q3 2004.

Shareholder communications costs of $139,036 in Q3 2004 compare to $26,669 in Q3 2003. Shareholder communications costs include dissemination costs associated with news releases, transfer agent and regulatory and filing fees, as well as fees associated with the maintenance of the Company's website. During Q3 2004, stock-based compensation expense of $75,003 is included in shareholder communication costs compared to $nil in Q3 2003. Investor relations contractual activities incurred in Q3 2004 totalled $46,806 compared to $15,219 in Q3 2003. High Visibility Public Relations, a media relations' consultant was paid $11,541 for fees and expenses in Q3 2004 compared to $nil in Q3 2003. Investor relations' activities include payments of $4,443 for fees and expenses to Coal Harbor Communications in Q3 2004 compared to $7,492 in Q3 2003 and $6,900 paid to Windward Communications for fees and expenses in Q3 2004 compared to $6,795 in Q3 2003. Michael Baybak and Company were paid $18,175 for fees and expenses in fiscal 2004, with no comparable expense in 2003.

The media campaign and investor relations' costs have increased the shareholder communication costs substantially in order to educate the community surrounding the Idaho-Maryland property, the investment community and shareholders of new developments in the Company. In Q3 2004, $8,907 has been expended on advertising and investor publications compared to $nil in Q3 2003.

Shareholder communication costs will continue to be a significant expense due to the increased interest in the Company and the related costs of informing shareholders and potential new investors about ongoing activities.

Exploration expenses:

Exploration expenditures on the Idaho-Maryland property increased from $245,481 in Q3 2003 to $786,818 in Q3 2004. Total expenditures in Q3 2004, with the related Q3 2003 expenditures in brackets, are as follows: consulting and engineering fees related to exploration and mine planning - $42,178 ($17,280); geological and geochemical - $271,851 ($72,184); site activities including ongoing evaluation of historic data and preparation of permit applications for the surface exploration and drilling programs - $168,972 ($48,964); and drilling - $254,266 ($73,055). The Company has a five-year lease and option to purchase the Idaho-Maryland property. The current lease commenced on June 1, 2002, and expires on May 31, 2007. Land lease and taxes in Q3 2004 total $25,500 ($19,475). Stock-based compensation for the vested portion of stock options granted on

July 12, 2004, is included in the following Idaho-Maryland exploration expense categories in fiscal 2004: geological and geochemical - $46,757, site activities - $31,992, and mine planning - $3,281.

Exploration expenditures on the Rozan, Stewart and Jazz properties totalled $51,182 in Q3 2004 compared to $3,587 in Q3 2003, as work programs were carried on during the 2004 quarter. Stock-based compensation expense of $9,843 is included in the total geological and geochemical expense of $32,941 in fiscal 2004, with no comparative expense in fiscal 2003. Drilling on the Jazz Property totalled $9,305 with assays and analysis of the drill results totalling $4,547. The work program on the Jazz property is required to fulfill the obligations for the exploration expenditures of Cdn$75,000 required under the property's option agreement.

Research and development expenses:

In Q3 2004 the Company expended $135,426 on development of the Ceramext™ Process. These costs include a net recovery of $41,095 in equipment for research and consumable materials. After a review of equipment purchased in the year, it was determined that some equipment utilized in the pilot plant research and development was capital in nature. As a result, $85,359 has been reclassified and capitalized in Q3 2004. Other expenditures include $46,596 on consultants, contractors, and hourly labour, $31,985 on site costs including $4,101 in stock-based compensation; $92,141 on engineering salaries including $40,195 in stock-based compensation, and $5,799 on transportation.

Summary of Quarterly Results

The table below provides, for each of the most recent eight quarters, a summary of exploration costs on a project-by-project basis and of corporate expenses.

	Ceramext™ Process	**Idaho-Maryland Property, California**	**Rozan Property, British Columbia**	**Stewart Property, British Columbia**	**Jazz Property and Others**	**General and administrative expenses** (Note 1)	**Loss per Quarter**	**Quarterly Loss per share**
2002								
Fourth Quarter	—	193,513	99	(124)	16	15,479	241,041	0.01
2003								
First Quarter	—	196,657	268	153	—	144,157	341,040	0.01
Second Quarter	—	214,277	39	157	—	150,206	362,784	0.01
Third Quarter	—	245,481	413	—	—	125,277	373,103	0.01
Fourth Quarter	24,054	330,707	59,779	53,293	—	1,666,449	2,083,653	0.06
2004								
First Quarter	461,216	695,847	648	840	—	286,478	1,416,040	0.03
Second Quarter	350,198	865,618	2,529	11,173	—	365,664	1,585,926	0.03
Third Quarter	135,426	786,818	15,689	11,143	24,350	465,915	1,422,736	0.03

Note 1: General and administrative expenses do not include interest revenue, or the write-down or recovery of mineral property interests.

Related Party Transactions

The Company has signed an exclusive worldwide license agreement with Ceramext, LLC to develop and use the Ceramext™ Process to convert mine tailings and other waste materials into ceramics. Under the terms of the agreement, the Company has obtained the worldwide rights to the Ceramext™ Process technology, subject to a monthly royalty of 3% of the gross sales revenue derived from the sales of physical products produced. In 2004, under the terms of the agreement, Emgold has paid $100,000 and has issued 200,000 common shares to Ceramext LLC, a private company controlled by a director of the Company. The worldwide rights will remain in force based upon maintaining the following minimum royalty payments: $5,000 per quarter in 2005; $10,000 per quarter in 2006; $20,000 per quarter in 2007; and $40,000 per quarter thereafter.

Related party balances are non-interest bearing and are due on demand, with no fixed terms of repayment, with the exception of the interest accrued on the preference shares.

Other related party transactions include the following transactions:

	Nine months ended September 30, 2004	Nine months ended September 30, 2003
Services rendered:		
Legal fees	$ 25,420	$ 23,873
Lang Mining Corporation	$ 18,685	$ 16,054
Director and project manager	$ 67,500	$ 67,500
LMC Management Services Ltd.	$ 461,392	$ 241,120

Balances receivable from (payable to):	September 30, 2004	December 31, 2003
LMC Management Services Ltd.	$ 60,562	$ 21,595
Legal fees	$ (7,926)	$ (28,810)
Directors, officers and employees	$ (90,494)	$ (69,263)
	$ (98,420)	$ (98,073)

Preference Shares

Mr. Frank A. Lang and Lang Mining Corporation (collectively "Lang") were major creditors of the Company as a result of advances made over a prolonged period in providing financial support to the Company. In 2002, the Company entered into an agreement with Lang to issue 3,948,428 Series A First Preference shares in full satisfaction of an aggregate of $602,521 in indebtedness owing to Lang, including the equity portion of the convertible debt. Terms of the preference shares are described below.

The Series A First Preference Shares rank in priority to the Company's common shares and are entitled to fixed cumulative preferential dividends at a rate of 7% per annum, of which $77,826 has been accrued. The shares are redeemable by the company at any time on 30 days of written notice at a redemption price of Cdn$0.80 per common share, but are redeemable by the holder only out of funds available that are not in the Company's opinion otherwise required for the development of the Company's mineral property interests or to maintain a minimum of Cdn$2 million in working capital. The accretion of the debt portion of the preference shares during fiscal 2004 was $13,191.

As is required by accounting standards, the value of the convertible preference shares was split into a debt component and an equity component. This resulted in $90,902 being included in equity. The balance of $545,456 is the value included in debt as preference shares.

The Series A First Preference Shares are non-voting unless and until the Company fails for any period aggregating two years or more to pay dividends, in which case they will carry one (1) vote per share at all annual and special meetings of shareholders thereafter.

Liquidity and Capital Resources

Operating Activities

The Company used $3,753,615 in its operations during the nine months ended September 30, 2004. These funds were utilized on exploration and development expenses at the Idaho-Maryland Mine in Grass Valley, California, research and development of the Ceramext™ technology, and for administration expenses.

Financing Activities

At September 30, 2004, Emgold had unrestricted working capital of $2,222,602, as compared to unrestricted working capital of $5,707,854 at December 31, 2003. Unrestricted working capital is defined as current unrestricted assets less current liabilities.

During the nine months ended September 30, 2004, 2,935,329 share purchase warrants were exercised at prices ranging from Cdn$0.55 to Cdn$1.00. In addition, 517,000 stock options were exercised at prices ranging from Cdn$0.10 to Cdn$0.30.

At September 30, 2004, the following warrants were exercisable:

Number of Warrants	Exercise Price (Cdn$)	Expiry Date
6,232,799	1.00	December 22, 2005

Contractual Obligations

The following table summarizes the Company's contractual obligations:

	October 1, 2004, to December 31, 2004	1-2 years	2-3 years	3-4 years	4-5 years	5th and subsequent years	Total
Long-term debt	$ --	$ --	$ --	$ --	$ --	$ --	$ --
Operating lease obligations	51,015	212,115	234,942	60,414	--	--	558,486
Idaho-Maryland property lease *(1)*	25,500	102,000	102,000	102,000	--	--	331,500
Mineral property option payments *(1)*	—	50,000	60,000	40,000	--	--	150,000
Ceramext™ royalties and payments	—	20,000	40,000	80,000	160,000	160,000	460,000
Rental property lease	7,200	28,800	9,600	--	--	--	45,600
	$83,715	$ 412,915	$ 446,542	$ 282,414	$ 160,000	$ 160,000	$1,545,586

(1) Mineral property option payments are made at the option of the Company, however non-payment of mineral property leases may result in forfeiture of Emgold's rights to a particular property.

(2) The amount shown in '5th and subsequent years' is a per-year figure.

The Company has no long-term debt other than the Class A preference shares described above.

Investing Activities

The Company has a five-year lease and option to purchase the Idaho-Maryland property. The current lease commenced on June 1, 2002, and expires on May 31, 2007. In fiscal 2004, $78,000 was expended on the quarterly lease and tax payments on the Idaho-Maryland property.

Emgold, through Emgold (US), has entered into a three-year lease and option to purchase agreement for a 44,750 square foot building located in Grass Valley, California. The building supports the further development of the Ceramext™ Process technology and provides office, laboratory, geological and storage facilities for the Idaho-Maryland and Golden Bear Ceramics project teams. Minimum lease payments are $17,005 per month beginning April 1, 2004, and will increase to $17,900 on April 1, 2005, and to $20,138 on April 1, 2006.

The Company entered into an agreement with a private, non-related company to jointly acquire approximately 45.4 acres adjacent to other properties under option by the Company in Grass Valley, California. The Company's share of the purchase price was $542,500 plus its share of closing costs.

Emgold has purchased laboratory and office equipment totalling $335,498 in fiscal 2004. The Company moved into new premises leased in Grass Valley, California on October 1, 2004.

Ceramext™ Process

Under the terms of the agreement, Emgold, through its subsidiary Golden Bear, has obtained the worldwide rights to the Ceramext™ technology, subject to a monthly royalty of 3% of the gross sales revenue derived from sales of physical products produced. Emgold paid Ceramext, LLC $100,000 in February 2004 to cover certain development costs. Emgold also issued to Ceramext, LLC 200,000 shares of the Company. The worldwide rights will remain in force based upon Golden Bear maintaining minimum royalty payments calculated on a quarterly basis that consist of: "Year 1" - $nil per quarter; "Year 2" - $5,000 per quarter; "Year 3" - $10,000 per quarter; "Year 4" - $20,000 per quarter; "Year 5" and thereafter - $40,000 per quarter. Year 1 will be deemed to commence 90 days after the date of approval of the agreement by regulatory authorities, which was February 12, 2004. In fiscal 2004 the Company has expended $979,652 on research including the design and fabrication of a pilot plant using the Ceramext™ Process technology.

Jazz Property, British Columbia

The Company entered into an option agreement to acquire a 100% interest in the Jazz Property consisting of twenty-four mineral claims (24 units) located in the Nelson Mining Division near Nelson, British Columbia. The property is contiguous to the Stewart Property and covers approximately 600 hectares. Under the terms of the agreement, the Company has agreed to make total cash payments of $215,000 to the optionor over a ten-year period. Cash payments in fiscal 2004 will total $10,000 ($5,000 paid). In exchange for the above cash payments, the Company will have the exclusive right and option to earn 100% interest in the property, subject only to the payment to the optionor of a 3.0% NSR and the completion of Cdn$75,000 in exploration work on the property within 2 years from the date of the agreement. The Company will have the right to purchase 2/3 of the NSR from the optionor for $1,000,000 at any time up to and including the commencement of commercial production.

Rozan Gold Property, British Columbia

In 2000 the Company entered into an option agreement to acquire the rights to the Rozan Gold Property, a prospect located south of the community of Nelson in the Red Mountain area of southeastern British Columbia. The Company can earn a 100% interest in the property by making stepped payments totalling Cdn$100,000 (Cdn$45,000 paid) and issuing 200,000 (200,000 issued) common shares by April 1, 2006.

Porph Claims, British Columbia

The Company has staked six claims contiguous to the Stewart Property located near Nelson in southeastern British Columbia.

Stewart Property, British Columbia

In 2001 the Company entered into an option agreement to acquire the rights to the Stewart mineral claims, a prospect located close to Nelson in southeastern British Columbia. The Company can earn a 100% interest in the property by making payments totaling Cdn$150,000 (Cdn$55,000 paid) and issuing 200,000 common shares (200,000 issued) by 2007. The Company also agreed to incur exploration expenditures of Cdn$49,200 over two years, which have been incurred.

During fiscal 2004, the Company will be required to make option payments of $41,996 (Cdn$55,000 paid to date), and issue 50,000 common shares (50,000 issued) to maintain its mineral property interests in British Columbia.

Uncertainties and Risk Factors

The uncertainties and risks affecting Emgold's activities are discussed in the Annual MD&A.

Critical Accounting Policies

The Company continues to follow the accounting policies described in the audited financial statements for the year ended December 31, 2003, that were mailed to shareholders in May of 2004.

Outlook

Emgold's primary focus in the balance of 2004 will be on activities that will include:

- Completing a financing to enable the Company to proceed with the recommendations of the recent Preliminary Assessment Report filed on November 23, 2004, on Sedar in Canada.
- Filing a Form 20-F as a registration statement with the United States Securities and Exchange Commission.
- Completing the application to obtain the Conditional Mine Use Permit for the Idaho-Maryland Mine.
- Operating the Ceramext™ Process pilot plant and working towards a positive feasibility study and associated marketing studies for specific areas of interest for the technology.
- Continuing with grass roots exploration of the Rozan, Stewart and Jazz properties.

EMGOLD MINING CORPORATION
(an exploration stage company)
INTERIM CONSOLIDATED FINANCIAL STATEMENTS

For the nine months ended September 30, 2004 and 2003
(expressed in United States dollars)
(Unaudited)

EMGOLD MINING CORPORATION

(an exploration stage company)
Consolidated Balance Sheets
(expressed in United States dollars)
(Unaudited)

	September 30, 2004	December 31, 2003
Assets		
Current assets		
Cash and cash equivalents	$ 2,453,149	$ 5,830,119
Restricted cash	--	8,667
Due from related parties (Note 6)	60,562	21,595
Prepaid expenses and deposits	108,877	27,672
Accounts receivable	42,866	21,518
	2,665,454	5,909,571
Plant and equipment	358,359	32,367
Mineral property interests (Note 2)	761,734	140,487
Other	6,399	6,399
	$ 3,791,946	$ 6,088,824
Liabilities and Shareholders' Equity		
Current liabilities		
Accounts payable and accrued liabilities	$ 344,432	$ 94,977
Due to related parties (Note 6)	98,420	98,073
	442,852	193,050
Preference shares (Note 3)	545,456	517,417
	988,308	710,467
Shareholders' equity		
Share capital (Note 3)	22,910,579	21,403,748
Cumulative translation adjustment	(577,456)	(577,456)
Contributed surplus	1,998,150	1,654,998
Deficit	(21,527,635)	(17,102,933)
	2,803,638	5,378,357
	$ 3,791,946	$ 6,088,824

See accompanying notes to consolidated financial statements.

Approved by the Directors

"Joel D. Schneyer"

Joel D. Schneyer
Director, Chair of the Audit Committee

"William J. Witte"

William J. Witte
Director

EMGOLD MINING CORPORATION

(an exploration stage company)
Consolidated Statements of Operations and Deficit
(expressed in United States dollars)
(Unaudited)

	Three months ended September 30, 2004	Three months ended September 30, 2003	Nine months ended September 30, 2004	Nine months ended September 30, 2003
Expenses				
Amortization	$ 4,226	$ 2,533	$ 9,506	$ 4,938
Accretion of debt portion of preference shares	4,467	--	13,191	--
Ceramext™ process research (see schedule)	135,426	--	946,840	--
Exploration expenses (see schedule)	838,000	249,068	2,414,655	660,619
Foreign exchange loss / (gain)	(49,279)	(890)	132,399	10,616
Finance expense	10,573	9,942	31,218	31,918
Legal, accounting and audit	43,508	13,892	75,100	40,795
Management and consulting fees	--	5,351	92,675	16,054
Office and administration	111,594	3,392	145,257	28,707
Salaries and benefits	194,168	50,042	318,604	145,643
Shareholder communications	139,036	26,669	259,292	121,034
Travel	7,622	14,346	40,815	19,936
	1,439,341	374,345	4,479,552	1,080,260
Other expenses and income				
Interest income	(16,605)	(1,242)	(54,850)	(3,333)
Loss for the period	1,422,736	373,103	4,424,702	1,076,927
Deficit, beginning of period	20,104,899	14,646,177	17,102,933	13,942,353
Deficit, end of period	$ 21,527,635	$ 15,019,280	$ 21,527,635	$ 15,019,280
Loss per share – basic and diluted	$ 0.03	$ 0.01	$ 0.09	$ 0.04
Weighted average number of common shares outstanding	47,077,121	28,669,952	46,672,863	27,837,126
Total common shares outstanding at end of period	47,158,099	30,493,480	47,158,099	30,493,480

See accompanying notes to consolidated financial statements.

EMGOLD MINING CORPORATION

(an exploration stage company)
Consolidated Statements of Shareholders' Equity
(expressed in United States dollars)
(Unaudited)

	Common Shares Without Par Value						
	Shares	Amount	Preference Shares	Contributed Surplus	Cumulative Translation Adjustment	Deficit	Total Shareholders' Equity
Balance, December 31, 2002	25,119,319	$ 14,191,476	$ --	$ --	$ (622,352)	$ (13,942,353)	$ (373,229)
Shares issued for cash:							
Private placement, less share issue costs	2,472,222	667,620	--	--	--	--	667,620
Private placement, less share issue costs	10,060,000	5,087,855	--	--	--	--	5,087,855
Flow-through private placement	160,000	112,559	--	--	--	--	112,559
FIT asset recognized as a result of flow-through private placement	--	(44,105)	--	--	--	--	(44,105)
Warrants exercised	4,775,847	1,069,264	--	--	--	--	1,069,264
Stock options exercised	623,000	98,460	--	--	--	--	98,460
Shares issued for other:							
Escrow shares cancelled	(4,558)	--	--	--	--	--	--
Cumulative rounding from prior years	50	--	--	--	--	--	--
Rozan property payment at Cdn$0.10	50,000	18,674	--	--	--	--	18,674
Stewart property payment at Cdn$0.28	50,000	26,552	--	--	--	--	26,552
Finance fee on private placement	150,000	84,491	--	--	--	--	84,491
Equity portion of preference shares issued on settlement of note payable	--	--	90,902	--	--	--	90,902
Stock-based compensation	--	--	--	1,654,998	--	--	1,654,998
Cumulative translation adjustment	--	--	--	--	44,896	--	44,896
Loss for the year	--	--	--	--	--	(3,160,580)	(3,160,580)
Balance, December 31, 2003	43,455,880	21,312,846	90,902	1,654,998	(577,456)	(17,102,933)	5,378,357
Shares issued for cash:							
Warrants exercised	2,935,219	1,236,089	--	--	--	--	1,236,089
Options exercised	517,000	59,731	--	--	--	--	59,731
Shares issued for other:							
Ceramext™ license agreement	200,000	182,108	--	--	--	--	182,108
Stewart property payment at Cdn$0.76	50,000	28,903	--	--	--	--	28,903
Stock-based compensation	--	--	--	343,152	--	--	343,152
Loss for the period	--	--	--	--	--	(4,424,702)	(4,424,702)
Balance September 30, 2004	47,158,099	$ 22,819,677	$ 90,902	$ 1,998,150	$ (577,456)	$ (21,527,635)	$ 2,803,638

See accompanying notes to consolidated financial statements.

EMGOLD MINING CORPORATION

(an exploration stage company)
Consolidated Statements of Cash Flows
(expressed in United States dollars)
(Unaudited)

	Three months ended September 30, 2004	Three months ended September 30, 2003	Nine months ended September 30, 2004	Nine months ended September 30, 2003
Cash provided by (used for):				
Operations:				
Loss for the period	$ (1,422,736)	$ (373,103)	$ (4,424,702)	$ (1,076,927)
Items not involving cash				
Amortization	4,226	2,533	9,506	4,938
Stock based compensation	242,344	--	343,152	--
Accretion of debt component of preference shares	4,467	--	13,191	--
Shares issued for Ceramext™ license agreement	--	--	182,108	--
Unrealized foreign exchange	18,797	(36,121)	(16,370)	54,714
Finance expense	10,573	9,942	31,218	31,918
	(1,142,329)	(396,749)	(3,861,897)	(985,357)
Changes in non-cash operating working capital				
Accounts receivable	(16,458)	2,317	(21,348)	(2,563)
Due to/from related parties	(2,995)	56,902	(38,620)	100,960
Prepaid expenses and deposits	(53,387)	(8,546)	(81,205)	6,989
Accounts payable and accrued liabilities	177,868	(11,544)	249,455	(27,852)
	(1,037,301)	(357,620)	(3,753,615)	(907,823)
Investing activities:				
Mineral property acquisition costs	(25,292)	(6,044)	(592,344)	(32,196)
Reclamation bonds	--	(2,973)	--	(4,284)
Equipment additions	(232,585)	(7,200)	(335,498)	(38,024)
	(257,877)	(16,217)	(927,842)	(74,504)
Financing activities:				
Class A preference share issue costs	--	(634)	—	(634)
Common shares issued for cash	15,411	597,491	1,295,820	1,317,382
	15,411	596,857	1,295,820	1,316,748
Increase (decrease) in cash and cash equivalents during the period	(1,279,767)	223,020	(3,385,637)	334,421
Cash, restricted cash, and cash equivalents, beginning of period	3,732,916	185,301	5,838,786	73,900
Cash and cash equivalents, end of period	$ 2,453,149	$ 408,321	$ 2,453,149	$ 408,321
Cash and cash equivalents is comprised of:				
Cash and in bank	$ 903,218	$ 295,762	$ 903,218	$ 295,762
Restricted cash	--	112,559	--	112,559
Short-term money market instruments	1,549,931	--	1,549,931	--
	$ 2,453,149	$ 408,321	$ 2,453,149	$ 408,321

See accompanying notes to consolidated financial statements.

The accompanying consolidated financial statements for the interim periods ended September 30, 2004 and 2003, are prepared on the basis of accounting principles generally accepted in Canada and are unaudited, but in the opinion of management, reflect all adjustments (consisting of normal recurring accruals) necessary for fair presentation of the financial position, operations and changes in financial results for the interim periods presented. The consolidated financial statements for the interim periods are not necessarily indicative of the results to be expected for the full year. These financial statements do not contain the detail or footnote disclosure concerning accounting policies and other matters, which would be included in full year financial statements, and therefore should be read in conjunction with the Company's audited financial statements for the year ended December 31, 2003.

1. Going concern assumption

These financial statements are prepared on a going-concern basis, which implies that the Company will continue realizing its assets and discharging its liabilities in the normal course of business. Accordingly, they do not give effect to adjustments that would be necessary should the Company be unable to continue as a going concern and therefore be required to realize its assets and liquidate its liabilities, contingent obligations and commitments in other than the normal course of business and at amounts different from those in these financial statements.

The Company is in the process of exploring its mineral property interests and has not yet determined whether its mineral property interests contain mineral reserves that are economically recoverable. The Company's continuing operations and the underlying value and recoverability of the amounts shown for mineral property interests are entirely dependent upon the existence of economically recoverable mineral reserves, the ability of the Company to obtain the necessary financing to complete the exploration and development of the mineral property interests, and on future profitable production or proceeds from the disposition of the mineral property interests.

As at September 30, 2004, the Company had unrestricted working capital of $2,222,602 and a deficit of $21,527,635.

The Company has capitalized $761,734 in acquisition costs related to the Idaho-Maryland, Rozan, Porph, Stewart and Jazz mineral property interests.

The current obligations in respect of the mineral property interests only secure a continuing interest in those properties. In order to realize the carrying value of these investments, the Company would be required to obtain additional funding or a joint venture partner would have to be identified to assist with the funding of these ventures. The Company has staked mineral claims in southeastern British Columbia.

These costs, mentioned above, are in addition to ongoing general and administration expenditures, costs on other exploration properties held by the Company, and costs required in connection with the Ceramext™ process.

Although the Company has taken steps to verify title to mineral properties in which it has an interest, in accordance with industry standards for the current stage of exploration of such properties, these procedures do not guarantee the Company's title. Property title may be subject to unregistered prior agreements and non-compliance regulatory requirements.

2. Mineral property interests

(a) Mineral property interests

The cumulative acquisition costs of the Company's interest in mineral property interests owned, leased or under option, consist of the following:

Mineral property acquisition costs	September 30, 2004	December 31, 2003
Idaho-Maryland Property, California	$ 557,429	$ 711
Rozan Property, British Columbia	73,518	60,568
Porph Claim, British Columbia	5,544	4,541
Stewart Property, British Columbia	120,197	74,667
Jazz Claims, British Columbia	5,046	--
	$ 761,734	$ 140,487

Jazz Property
In 2004, the Company entered into an option agreement to acquire a 100% interest in the Jazz Property consisting of twenty-four mineral claims (24 units) located at latitude 49°17'N and longitude 117°21'W in the Nelson Mining Division near Nelson, British Columbia. The property is contiguous to the Stewart Property and covers approximately 600 hectares. Under the terms of the agreement, the Company has agreed to make total cash payments of $215,000 to the optionor over a ten-year period. Cash payments in the first year will total $20,000 ($5,000 paid). In exchange for the above cash payments, the Company will have the exclusive right and option to earn 100% interest in the property, subject only to the payment to the optionor of a 3.0% NSR (Net Smelter Returns) royalty and the completion of Cdn$75,000 in exploration work on the property within 2 years from the date of the agreement. The Company will have the right to purchase 2/3 of the NSR from the optionor for $1,000,000 at any time up to and including the commencement of commercial production.

(b) Ceramext™ Process

In 2004, the Company signed an exclusive worldwide license agreement with Ceramext, LLC to develop and use the Ceramext™ Process to convert mine tailings and other waste materials into ceramics. The Ceramext™ Process is a patented technology capable of converting a wide variety of raw materials, including mine tailings and fly ash into industrial ceramics such as floor tile, roof tile, brick, construction materials and other industrial and commercial products.

Under the terms of the agreement, the Company has obtained the worldwide rights, subject to a monthly royalty of 3% of the gross sales revenue derived from the sales of physical products produced. Under the terms of the agreement, Emgold paid $100,000 and issued 200,000 common shares to Ceramext LLC, a private company controlled by a director of the Company. The worldwide rights will remain in force based upon maintaining the following minimum royalty payments: $5,000 per quarter in 2005; $10,000 per quarter in 2006; $20,000 per quarter in 2007; and $40,000 per quarter thereafter. Research costs relating to the Ceramext™ Process will be expensed until the completion of a scalable demonstration plant.

3. Share capital

Authorized:

500,000,000 common shares without par value

50,000,000 first preference shares without par value

Preference shares:

Series A First Preference Shares	Number of Shares		Amount
Balance, December 31, 2002	--	$	--
Shares issued for indebtedness, equity portion	3,948,428		90,902
Equity Balance, December 31, 2003 and September 30, 2004	3,948,428		90,902
Balance, December 31, 2002	--	$	--
Shares issued for indebtedness, debt portion	--		517,417
Debt Balance, December 31, 2003	--		517,417
Accretion of debt	--		13,191
Foreign exchange loss on debt	--		14,848
Debt Balance, September 30, 2004	--	$	545,456

During fiscal 2002, the Company entered into agreements with Mr. Frank A. Lang and Lang Mining Corporation (collectively "Lang") to issue 3,948,428 Series A First Preference shares in full satisfaction of Cdn$769,686 of indebtedness to Lang. The Series A Preference shares rank in priority to the Company's common shares and are entitled to fixed cumulative preferential dividends at a rate of 7% per annum. At September 30, 2004, $77,826 in dividends payable have been accrued and are classified as due to related party.

The shares are redeemable by the Company on 30 days written notice at a redemption price of Cdn$0.80 per common share, but are redeemable by the holder only out of funds available that are not in the Company's opinion otherwise required for the development of the Company's mineral property interests or to maintain a minimum of Cdn$2 million in working capital.

The Series A First Preference Shares are convertible into common shares at any time at a ratio of one common share for every four Series A First Preference Shares, which represents an effective conversion price of Cdn$0.80 per common share. The Preference Shares also have attached a gold redemption feature by which holders may elect at the time of any proposed redemption to receive gold in specie valued at $300 per ounce in lieu of cash, provided the Company has on hand at the time gold in specie having an aggregate value of not less than the redemption amount.

3. Share capital (continued)

Stock options:

The Company has a fixed stock option plan for its directors and employees to acquire common shares of the Company at a price determined by the fair market value of the shares at the date of grant. The maximum aggregate number of common shares reserved for issuance pursuant to the plan is 5,584,616 common shares. There are currently 6,114,000 stock options outstanding, exercisable for periods up to ten years. Options granted to officers and directors in July 2004 are subject to disinterested shareholder approval at the next annual meeting of shareholders.

The fair value of each stock option granted is estimated on the date of grant using the Black-Scholes option-pricing model with weighted average assumptions as follows:

	Nine months ended September 30, 2004	2003
Risk free interest rate	2.43% - 2.53%	--
Expected life (years)	3	--
Expected volatility	128% - 130%	--
Weighted average fair value per option grant	$0.83 - $0.93	--

The Black-Scholes option valuation model was developed for use in estimating the fair value of traded options that are fully transferable and have no vesting restrictions. The Company's stock options are not transferable, cannot be traded and may have vesting provisions. The Black-Scholes model also requires an estimate of expected volatility. The Company uses historical market data to arrive at an estimate of expected volatility. Changes in the subjective input assumptions can materially affect the fair value estimate, and therefore the model does not necessarily provide a reliable measure of the fair value of the Company's stock options.

4. Commitments

The Company entered into a three-year lease and option to purchase agreement for a 44,750 square foot building located in Grass Valley, California. Minimum lease payments are $17,005 per month beginning April 1, 2004, and will increase to $17,900 on April 1, 2005, and to $20,138 on April 1, 2006.

The Company entered into a two-year lease for a house in Grass Valley at $2,400 per month.

5. Supplementary information

	Three months ended September 30, 2004	2003	Nine months ended September 30, 2004	2003
Shares issued for mineral property interests	$ 28,903	$ 26,552	$ 28,903	$ 45,226
Shares issued for Ceramext license agreement	$ --	$ --	$ 182,108	$ --

6. Related party transactions and balances

Related party balances are non-interest bearing and are due on demand, with no fixed terms of repayment, with the exception of preference shares (Note 3).

Services rendered:	For the nine months ended September 30, 2004	September 30, 2003
Legal fees (a)	$ 25,420	$ 23,873
Lang Mining Corporation (d)	$ 18,685	$ 16,054
Director and project manager ((b) and Note 2(b))	$ 67,500	$ 67,500
LMC Management Services Ltd. (c)	$ 461,392	$ 241,120

Balances receivable from (payable to):	September 30, 2004	December 31, 2003
LMC Management Services Ltd.	$ 60,562	$ 21,595
Legal fees	(7,926)	(28,810)
Directors, officers and employees (Note 3)	(90,494)	(69,263)
	$ (98,420)	$ (98,073)

(a) Legal fees were paid to a law firm of which a director is a partner.

(b) A director of the Company, who is also project manager at the Idaho-Maryland property, receives fees for project management consulting services.

(c) Commencing August 1, 2001, management, administrative, geological and other services are provided by LMC Management Services Ltd. ("LMC"), a private company held jointly by the Company and other public companies, to provide services at cost to the various public entities currently sharing office space with the Company. Currently the Company has a 25% interest in LMC. Three months of estimated working capital is required to be on deposit with LMC under the terms of the services agreement. There is no difference between the cost of $1 and equity value.

(d) Lang Mining Corporation ("Lang Mining") is a private company controlled by an officer and director of the Company. Commencing January 1, 2003, Cdn$2,500 per month is being paid to Lang Mining for the services of the chairman of the Company.

7. Segmented information

The Company has two operating segments: the exploration and development of mineral properties, and the research and development of the Ceramext™ technology. For the year ended December 31, 2003, only one operating segment was identified – the exploration and development of mineral properties. In the nine months ended September 30, 2004, research and development of the Ceramext technology has increased substantially over prior periods, leading to the reporting of the Ceramext technology expenditures as a separate operating segment.

The Company's principal operations are in Canada and the United States of America. All of the investment income is earned in Canada.

Segmented assets and loss by operating segment are as follows:

Total assets	Mineral properties	Ceramext™ technology	Total
September 30, 2004 (Unaudited)	$ 2,320,912	$ 1,471,034	$ 3,791,946
December 31, 2003	$ 6,088,824	--	$ 6,088,824
December 31, 2002	$ 208,441	--	$ 208,441

Loss	Mineral properties	Ceramext™ technology	Total
Nine months ended			
September 30, 2004 (Unaudited)	$ 2,837,419	$ 1,587,283	$ 4,424,702
Year ended December 31, 2003	$ 3,136,526	$ 24,054	$ 3,160,580
Year ended December 31, 2002	$ 242,909	$ --	$ 242,909

Segmented assets and loss by geographic location are as follows:

Total assets	Canada	United States	Total
September 30, 2004 (Unaudited)	$ 2,133,703	$ 1,658,243	$ 3,791,946
December 31, 2003	$ 5,962,170	$ 126,654	$ 6,088,824
December 31, 2002	$ 161,282	$ 47,159	$ 208,441

Loss	Canada	United States	Total
Nine months ended			
September 30, 2004 (Unaudited)	$ 1,005,746	$ 3,418,956	$ 4,424,702
Year ended December 31, 2003	$ 2,048,647	$ 1,111,933	$ 3,160,580
Year ended December 31, 2002	$ 152,050	$ 90,859	$ 242,909

8. Comparative figures

Comparative figures have been restated, where required, to conform to the current period's presentation.

EMGOLD MINING CORPORATION

(an exploration stage company)
Consolidated Schedules of Exploration Expenses
Nine *months ended* September 30, 2004 *and* 2003
(expressed in United States dollars)

	Three months ended September 30, 2004	Three months ended September 30, 2003	Nine months ended September 30, 2004	Nine months ended September 30, 2003
Idaho-Maryland Mine, California				
Exploration costs				
Assays and analysis	$ 8,828	$ 7,498	$ 67,766	$ 8,115
Drilling	254,266	73,055	903,869	122,753
Geological and geochemical	271,851	72,184	532,503	204,834
Land lease and taxes	25,500	19,475	78,000	60,992
Mine planning	42,178	17,280	356,535	113,012
Site activities	168,972	48,964	366,725	127,736
Transportation	15,223	7,025	42,885	18,973
Incurred during the period	786,818	245,481	2,348,283	656,415
Jazz Property, British Columbia				
Exploration costs				
Assays and analysis	4,547	--	4,547	--
Drilling	9,305	--	9,305	--
Geological and geochemical	8,640	--	8,640	--
Transportation	1,858	--	1,858	--
Incurred during the period	24,350	--	24,350	--
Rozan Property, British Columbia				
Exploration costs				
Assays and analysis	--	--	--	71
Geological and geochemical	14,026	398	17,203	634
Site activities	203	15	203	15
Transportation	1,460	--	1,460	--
Incurred during the period	15,689	413	18,866	720
Stewart Property, British Columbia				
Exploration costs				
Geological and geochemical	10,275	2,868	20,781	3,174
Transportation	868	306	2,375	310
Incurred during the period	11,143	3,174	23,156	3,484
Total Exploration Expenses	$ 838,000	$ 249,068	$ 2,414,655	$ 660,619

EMGOLD MINING CORPORATION

(an exploration stage company)
Consolidated Schedules of Research costs
Nine months ended September 30, 2004 and 2003
(expressed in United States dollars)

Ceramext™ process costs	**Nine months ended September 30, 2004**	**Three months ended September 30, 2004**
Equipment for research and consumable materials	$ 168,631	$ (41,095)
Ceramext™ technology licence fee and bench-scale research facility	282,108	--
Consultants, contractors and hourly labour	279,091	46,596
Site costs	84,027	31,985
Engineering salaries	113,427	92,141
Transportation	19,556	5,799
	$ 946,840	$ 135,426

Note that Ceramext™ process costs for the three and nine months ended September 30, 2003 were nil.

FORM 52-109FT2
CERTIFICATION OF INTERIM FILINGS DURING TRANSITION PERIOD

I, **SHANNON M. ROSS,** Chief Financial Officer of **EMGOLD MINING CORPORATION,** certify that:

1. I have reviewed the interim filings (as this term is defined in *Regulation 52-109 respecting Certification of Disclosure in Issuers' Annual and Interim Filings)* of **EMGOLD MINING CORPORATION** (the issuer) for the interim period ending September 30, 2004;

2. Based on my knowledge, the interim filings do not contain any untrue statement of a material fact or omit to state a material fact required to be stated or that is necessary to make a statement not misleading in light of the circumstances under which it was made, with respect to the period covered by the interim filings; and

3. Based on my knowledge, the interim financial statements together with the other financial information included in the interim filings fairly present in all material respects the financial condition, results of operations and cash flows of the issuer, as of the date and for the periods presented in the interim filings.

Date: November 26, 2004

"Shannon M. Ross"

Shannon M. Ross
Chief Financial Officer

FORM 52-109FT2
CERTIFICATION OF INTERIM FILINGS DURING TRANSITION PERIOD

I, **WILLIAM J. WITTE,** President and Chief Executive Officer of **EMGOLD MINING CORPORATION,** certify that:

1. I have reviewed the interim filings (as this term is defined in *Regulation 52-109 respecting Certification of Disclosure in Issuers' Annual and Interim Filings)* of **EMGOLD MINING CORPORATION** (the issuer) for the interim period ending September 30, 2004;

2. Based on my knowledge, the interim filings do not contain any untrue statement of a material fact or omit to state a material fact required to be stated or that is necessary to make a statement not misleading in light of the circumstances under which it was made, with respect to the period covered by the interim filings; and

3. Based on my knowledge, the interim financial statements together with the other financial information included in the interim filings fairly present in all material respects the financial condition, results of operations and cash flows of the issuer, as of the date and for the periods presented in the interim filings.

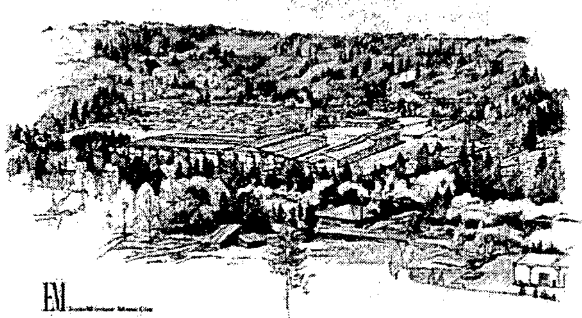
Date: November 26, 2004

"William J. Witte"

William J. Witte
President and Chief Executive Officer

Idaho-Maryland Mining Corporation

PRELIMINARY ASSESSMENT TECHNICAL REPORT



Idaho-Maryland Mine
Grass Valley, California

Prepared for:

Emgold Mining Corporation

Effective Date: 22 November 2004

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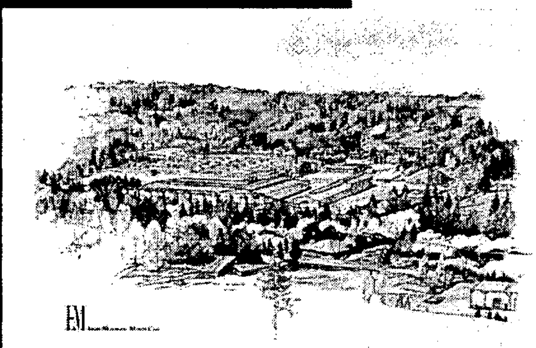
IMPORTANT NOTICE

PRELIMINARY ASSESSMENT TECHNICAL REPORT

EMGOLD Idaho-Maryland Mining Corporation



Certificates

amec

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CERTIFICATE OF QUALIFIED PERSON

Sean Waller, M.Sc., P.Eng.
111 Dunsmuir Street, Suite 400
Vancouver, BC
Tel: (604) 664-4503
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sean.waller@amec.com

I, Sean Waller, M.Sc., P.Eng., am a Professional Engineer, employed as a Senior Process Engineer of AMEC Americas Limited and residing at 1258 Greenbriar Way, North Vancouver, in the Province of British Columbia.

I am a member of the Association of Professional Engineers and Geoscientists of British Columbia. I graduated from the Montana College of Mineral Science and Technology with a Bachelor of Science degree in Geological Engineering in 1985 and a Master of Science degree in Mineral Processing Engineering in 1986.

I have practiced my profession continuously since 1986. I have been directly involved in mineral process plant design engineering, commissioning, operation and supervision.

As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101.

I am currently a Consulting Process Engineer and have been so since 1986.

I have not visited the Idaho-Maryland project in California. I was responsible for management of the study, the review of matters related to the crushing and grinding circuit including process design, capital and operating costs, and certain infrastructure and site services.

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 this report and that the omission to disclose would make this report misleading.

I am independent of Emgold Mining Corporation in accordance with the application of Section 1.5 of National Instrument 43-101.

I have read National Instrument 43-101 and Form 43-101FI and this report has been prepared in compliance with same.

Dated at Vancouver, British Columbia, this 22nd day of November 2004.

Sean Waller, M.Sc., P.Eng.

PROFESSIONAL ENGINEER S. WALLER

CONSENT OF QUALIFIED PERSON

TO: Alberta Securities Commission
Autorité des marchés financiers
British Columbia Securities Commission

AND TO: Emgold Mining Corporation.

I, Sean Waller, M.Sc., P.Eng., do hereby consent to the filing of the technical report prepared for Emgold Mining Corporation, *Preliminary Assessment Technical Report – Idaho-Maryland Mine, Grass Valley, California*, dated 22 November 2004 with the securities regulatory authorities referred to above.

DATED at this 22nd day of November 2004.

Sean Waller, M.Sc., P.Eng.

PROFESSIONAL ENGINEER

AMEC Americas Limited
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CERTIFICATE OF AUTHOR

Carl E. Frahme, Ph.D.
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Frahme Consulting Services, Inc.
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cfrahme@frahme.com

I, Carl E. Frahme, Ph.D., am a consulting ceramic engineer, QP, and President of Frahme Consulting Services, Inc. of Sun Valley, CA, USA

I am a Member and Fellow of The American Ceramic Society and a member of The National Institute of Ceramic Engineers. I graduated from the Case Institute of Technology (now Case Western Reserve University) with a Bachelor of Science (Honours) degree in Metallurgical Engineering in 1962 and from Rutgers- The State University with a Doctor of Philosophy degree in Ceramic Science and Engineering in 1967. I have practiced my profession continuously since 1966.

Since 1966 I have been involved in: research and development in ceramic materials and processing; product development, marketing and sales of refractory ceramic fiber insulation materials; evaluation of advanced materials developed in the Ukraine; development of foamed glass materials; ceramic education, including instructing at UCLA and Pasadena City College and co-founding Ceramic Correspondence Institute; and professional consulting to a number of ceramic companies in a variety of technical and business areas.

As a result of my experience and qualification, I am a Qualified Person as defined in NP 43-101

am presently a consultant to the ceramic industry and have been so since October, 1987.

From January, 2004 until the present I have visited Golden Bear Ceramics at their pilot plant in Grass Valley, CA for the purposes of reviewing the development and commercialization of the Ceramext™ process for converting mine development rock and other materials into high value ceramic products.

The portions of this report relating to ceramic technology and marketing were prepared directly by me.

I am not aware of any material fact or material change with respect to the subject matter of this technical report, which is not reflected in this report, the omission to disclose which would make this report misleading.

I am independent of Emgold Mining Corporation, Idaho-Maryland Mining Corporation and Golden Bear Ceramics Company in accordance with the application of Section 1.5 of National Instrument 43-101.

I have read National Instrument 43-101, Form 43-101FI and this report has been prepared in compliance with NI 43-101 and Form 43-101FI.

Dated at Sun Valley, NV this 22nd of November, 2004.

Carl E Frahme

Dr. Carl E. Frahme

amec

CONSENT OF QUALIFIED PERSON

TO: Alberta Securities Commission
Autorité des marchés financiers
British Columbia Securities Commission

AND TO: Emgold Mining Corporation.

I, Carl E. Frahme, Ph.D., do hereby consent to the filing of the technical report prepared for Emgold Mining Corporation, *Preliminary Assessment Technical Report – Idaho-Maryland Mine, Grass Valley, California*, dated 22 November 2004 with the securities regulatory authorities referred to above.

DATED at this 22nd day of November 2004.

Carl E. Frahme, Ph.D.

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CERTIFICATE OF QUALIFIED PERSON

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stephen.juras@amec.com

I, Stephen J. Juras, P.Geo., am a Professional Geoscientist, employed as Chief Geologist of AMEC Americas Limited and residing at 9030 161 Street in the City of Surrey in the Province of British Columbia.

I am a member of the Association of Professional Engineers and Geoscientists of British Columbia. I graduated from the University of Manitoba with a Bachelor of Science (Honours) degree in geology in 1978 and subsequently obtained a Master of Science degree in geology from the University of New Brunswick in 1981 and a Doctor of Philosophy degree in geology from the University of British Columbia in 1987.

I have practiced my profession continuously since 1987 and have been involved in: mineral exploration for copper, zinc, gold and silver in Canada and United States and in underground mine geology, ore control and resource modelling for copper, zinc, gold, silver, tungsten, platinum/palladium and industrial mineral properties in Canada, United States, Brazil, Peru, Chile, Vietnam and Russia.

As a result of my experience and qualifications, I am a Qualified Person as defined in NP 43-101.

I am currently a Consulting Geologist and have been so since January 1998.

From 3 June 2004 to 4 June 2004, and on 29 October 2004 I visited the Idaho-Maryland project in California for the purposes of reviewing pertinent geological data in sufficient detail to independently support the data incorporated into estimating the 2004 Idaho-Maryland gold and industrial mineral resource estimates. Sections 7 through 14 and Section 17 of this report were prepared under my direct supervision.

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 this report and that the omission to disclose would make this report misleading.

I am independent of Emgold Mining Corporation in accordance with the application of Section 1.5 of National Instrument 43-101.

I have read National Instrument 43-101 and Form 43-101FI and the sections for which I am responsible in this report, *Preliminary Assessment Technical Report – Idaho-Maryland Mine, Grass Valley, California, 22 November 2004,* has been prepared in compliance with same.

Dated at Vancouver, British Columbia, this 22nd day of November 2004.

Stephen J. Juras, Ph.D., P.Geo.

PROFESSIONAL
PROVINCE OF
S. J. JURAS
BRITISH COLUMBIA
GEOSCIENTIST

amec

CONSENT OF QUALIFIED PERSON

TO: Alberta Securities Commission
Autorité des marchés financiers
British Columbia Securities Commission

AND TO: Emgold Mining Corporation.

I, Stephen J. Juras, Ph.D., P.Geo., do hereby consent to the filing of the technical report prepared for Emgold Mining Corporation, *Preliminary Assessment Technical Report – Idaho-Maryland Mine, Grass Valley, California*, dated 22 November 2004 with the securities regulatory authorities referred to above.

DATED at this 22nd day of November 2004.

Stephen J. Juras, Ph.D., P.Geo.

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joe.ringwald@amec.com

I, Joe Ringwald, B. A. Sc., P.Eng., am a Professional Engineer, employed as a Technical Director - Mining of AMEC Americas Limited and residing at New Westminster, in the Province of British Columbia.

I am a member of the Association of Professional Engineers and Geoscientists of British Columbia. I graduated from the University of British Columbia in 1988 with a Bachelor of Applied Science degree in Mining and Mineral Process Engineering.

I have practiced my profession continuously since 1988. I have been directly involved in mine design engineering, mine project management and mine evaluation.

As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101.

I am currently a Consulting Mining Engineer and have been so since 1988.

I have not visited the Idaho-Maryland project in California. I was responsible for technical peer review of matters related to the mine design, mine capital and mine operating cost estimates.

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 this report and that the omission to disclose would make this report misleading.

I am independent of Idaho-Maryland Mining Corporation in accordance with the application of Section 1.5 of National Instrument 43-101.

I have read National Instrument 43-101 and Form 43-101FI and this report has been prepared in compliance with same.

Dated at Vancouver, British Columbia, this 22nd day of November 2004.

APEGBC #24195

Joe Ringwald, B.A.Sc., P.Eng.

CONSENT OF QUALIFIED PERSON

TO: Alberta Securities Commission
Autorité des marchés financiers
British Columbia Securities Commission

AND TO: Emgold Mining Corporation.

I, Joseph, Ringwald, B.A.Sc., P.Eng. do hereby consent to the filing of the technical report prepared for Emgold Mining Corporation and dated November 22nd, 2004 in respect of the Idaho-Maryland Mine Project, California, USA.

DATED at Vancouver, B.C., Canada this 22nd day of November 2004.

APEGBC #24195

Joe Ringwald, B.A.Sc., P.Eng.

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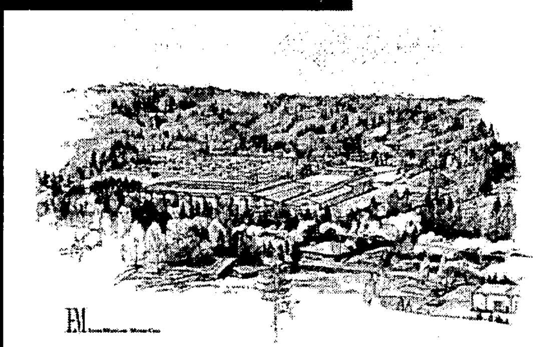
EMGOLD Idaho-Maryland Mining Corporation



SECTION 1

Summary

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1.0 SUMMARY

1.1 Introduction

The Idaho-Maryland Mining Corporation (Idaho-Maryland) is a wholly owned subsidiary of Emgold Mining Corporation (Emgold). Idaho-Maryland holds a mining lease and option to purchase the Idaho-Maryland property. The property encompasses a previously mined gold deposit suitable for further gold exploration and a recently defined industrial minerals deposit that may be suitable for the production of ceramic products. The Idaho-Maryland property is located near the eastern side of the City of Grass Valley, Nevada County, within the State of California.

The overall development plan for the Idaho-Maryland project envisions the following three major components:

1. Development of a decline to access underground drill stations for gold exploration

2. Construction of a commercial ceramics production facility which will utilize development rock from the decline and rock from an underground room-and-pillar mine as feed material

3. Upon confirmation of an economic gold resource, establishment of a commercial gold mine and processing operation, integrated with the ceramics process so that gold process tailings and development rock would become the feedstock for the ceramic process

This technical assessment specifically evaluates the development of the decline plus the establishment of a stand-alone industrial minerals mine and ceramics production facility and describes further exploration potential for gold at the Idaho-Maryland project.

The establishment of a gold mine and processing operation is contingent on successful gold exploration. A stand-alone gold mine and process plant has been assessed in previous AMEC reports and is not specifically addressed in this Preliminary Assessment.

Previous work by Emgold focused on identifying and developing the gold resource at the property with the objective of establishing a commercial gold mine. Idaho-Maryland has stated that it plans to continue development of the gold resources and a significant underground gold exploration program is planned. The exploration program will require development of a long decline to access underground drill stations. In driving the decline, and if a commercial gold mining operation is ultimately established, Idaho-Maryland will not be able to obtain sufficient nearby land holdings to construct both a long-term waste rock and tailings storage facility. Operations will eventually entail disposal of waste material off site. The permitting, logistics and financial effects caused by ongoing off-site waste disposal will likely impact the project to the extent that it may no longer be feasible. In response to this, Idaho-Maryland management identified and licensed a new technology that offers the potential to utilize the development rock and gold process tailings for the production of ceramic building products. The trade name for the technology is Ceramext™. The Ceramext™ process is a new, patented, and proprietary process for the manufacture of ceramic products. The process has been tested at the lab and pilot-plant scale currently, there are no full-scale commercial operations utilizing the process. Implications for scale-up to commercial application, including technical and economic parameters, are still to be determined. Large domestic and international markets exist for quality ceramics products, but acceptance of Ceramext™ ceramic products will ultimately depend on quality and price. Successful application of the Ceramext™ technology is projected to consume all the mine waste rock and process tailings thereby eliminating the requirement for long-term surface storage of these materials.

The successful production and sales of ceramic materials would allow Idaho-Maryland to continue with exploration of additional gold targets, then pre-production development, with the objective to define an economic gold reserve while generating positive cash flow from the ceramics production.

1.2 Geology and Mineral Resource

1.2.1 Geological Setting

The Idaho-Maryland mine and the Grass Valley Mining District are situated in the northern portion of the Sierra Nevada Foothills Gold Belt. This belt averages 50 miles in width and extends for 320 miles in a north-northwest orientation along the western slope of the Sierra Nevada range. The extent of the Sierra Nevada Foothills Gold Belt coincides closely with the outcrop area of the Sierra Nevada Foothills Metamorphic Belt.

The rocks underlying the Idaho-Maryland mine property are divisible into five separate units ranging in age from early to late Jurassic:

1. Early Jurassic meta-sediments of the Fiddle Creek Complex
2. Early Jurassic meta-volcanics and interflow sediments of the Lake Combie Complex
3. Middle Jurassic ophiolitic assemblage of the Spring Hill Tectonic Mélange
4. Discontinuous later Jurassic Tectonic Mélange of the Weimar Fault Zone
5. Late Jurassic dioritic intrusives.

The most important of these units with respect to the feed material for the ceramics manufacturing process are the Jurassic meta-volcanics. With regard to exploration for gold mineralization, the Spring Hill Tectonic mélange is the unit of primary interest.

The Idaho-Maryland property hosts a structurally controlled deformation zone terminated at its eastern end by a regional fault. Within this deformation corridor, large dismembered clasts of predominantly ophiolitic igneous origin are present in a foliated serpentinite melange matrix. These large clasts are referred to as slabs in Idaho-Maryland company reports. Identified slabs consist of albitized (sausserite) meta-gabbro, massive antigorite serpentinite, meta-diabase, meta-diorite, slates, and basaltic to dacitic meta-volcanics.

The largest slab of metavolcanic rocks on the property is the Brunswick Slab, which is 1.5 miles in length, approximately 0.6 miles in width, elongated in an eastward direction, and open at depth. This slab is interpreted to be derived from the Lake Combie Complex, and the industrial minerals resource is a block within this slab.

The industrial minerals feedstock deposit consists mostly of metamorphosed andesite, dacite, diabase and gabbro correlative with the Lake Combie Complex. These rocks were observed in drill core and outcropping on the surface as well.

1.2.2 Summary of Industrial Mineral Resource (Ceramics Feedstock)

The industrial minerals ceramics feedstock resource was delineated by seven geotechnical core holes drilled at inclinations of 40° and 45°, one exploration core hole, seven surface sample sites, and certain geologic data from historical underground mine drifts. The top boundary of the resource is 200 ft below the ground surface (due to depth of mineral rights). Drill hole spacing ranged from 80 ft to 1,200 ft. The lower boundary of the resource is based on the bottom of the drill holes, since drilling ended within Lake Combie Complex igneous rock units. The west boundary is where the amount of gabbro and ultramafic rocks begin to increase. The east boundary is based on the limit of geotechnical drilling and surface sampling.

The Idaho-Maryland project has measured, indicated, and inferred industrial minerals (ceramics) feedstock resources, as summarized in Table 1-1.

Table 1-1: Summary of Ceramics Feedstock Resources, 5 November 2004

Classification	Tons
Measured mineral resources	48,817,000
Indicated mineral resources	122,685,000
Measured + Indicated mineral resources	171,502,000
Inferred mineral resources	358,112,000

1.2.3 Gold Resource

The Idaho-Maryland property hosts a significant gold deposit first discovered in 1851. Gold mining commenced in 1862 and continued until 1954. The Idaho-Maryland was the second largest underground gold producer in California.

The varying styles of mineralization present at the Idaho-Maryland project are typical of those commonly found in mesothermal lode gold deposits worldwide. At least four basic types of mineralization have been recognized to contain significant gold deposits. In order of importance these include: 1) gold-quartz veins, 2) mineralized black slate bodies, 3) mineralized diabasic slabs, and 4) altered, mineralized phyllonites. The veins consist primarily of quartz, which is milky white, massive to banded, sheared, and brecciated. Gold occurs as native gold, ranging from very fine grains within the quartz to leaves or sheets along fractures.

Table 1-2: Gold Resources, 20 September 2004

	True Thickness (ft)	Tonnage (tons)	Gold Grade (oz/ton)	Gold (oz)	Gold Grade (oz/ton) 1.44 MCF	Gold (oz) 1.44 MCF[1]
Idaho-Maryland Project [2]						
Measured Mineral Resource 1	13.3	271,000	0.22	59,000	0.31	85,000
Measured Mineral Resource 2	70.7	831,000	0.15	127,000	0.15	127,000
Indicated Mineral Resource	8.1	489,000	0.35	172,000	0.50	243,000
Measured + Indicated Mineral Resources	**41.1**	**1,666,000**	**0.22**	**375,000**	**0.28**	**472,000**
Inferred Mineral Resources	9.3	2,526,000	0.26	666,000	0.38	952,000

1. MCF = Mine Call Factor (not applicable to Waterman Group resources). **2.** Idaho-Maryland measured resources are split into two categories: 1. the Eureka, Idaho, Dorsey, and Brunswick Groups, and 2. the Waterman Group (stockwork/slate type ore).

1.3 Exploration

1.3.1 Industrial Minerals Resource Exploration

Emgold, initiated exploration of the Idaho-Maryland property in 1993. Emgold's wholly owned subsidiary, Idaho-Maryland has continued exploration to the present. The primary focus has been to identify gold mineralization with the objective of developing a mineable gold resource.

More recently, Emgold identified and secured rights to a new potentially commercial ceramics manufacturing process and realized that the Idaho-Maryland property may host mineral resources suitable as feedstock for the process. Initial investigations of the meta-volcanic rock were begun in June 2004 with a geotechnical drilling program designed to obtain data for the design of a mine access ramp. Geological information from this program was also analyzed to determine if the rock excavated during ramp construction would be suitable feedstock for the ceramics process. The analysis included surface geologic mapping, outcrop sampling, sampling of the diamond drill core, and testing of samples to assess their suitability for ceramics manufacture. The result of these analyses was the definition of a large volume of igneous rocks of similar composition that were considered satisfactory as an industrial mineral resource suitable for ceramics manufacture.

The industrial rock resource is adequately defined by core drilling, but further testing, marketing, and production of ceramic products using the Ceramext™ Process, and the beginning of underground development will be necessary to upgrade industrial rock resources into reserves. No further core drilling of the meta-volcanics is planned until access is developed underground.

1.3.2 Gold Exploration

The gold exploration program has consisted of an extensive geologic evaluation of the historical mine records plus additional diamond drilling from surface. This rather unique program was possible because of the excellent and comprehensive preservation of the historical Idaho-Maryland mine and mill records. Idaho-Maryland has indicated this data is exhaustive and essentially complete, and was used to generate a consistent, property-wide structural geology model and vein set definition and chronology. Unmined mineralization was identified along underground workings and in historical diamond drill holes. Interpretation of the updated geologic model defined new vein sets and extensions of known vein sets. These were categorized for mineral resource estimates, future exploration, and expansion.

There is potential to identify additional gold resources on the Idaho-Maryland property, and Idaho-Maryland management has indicated its intent to continue with an ongoing gold exploration program. An access ramp is planned to establish underground drilling stations for further drill testing of key gold target areas, plus definition and expansion of known gold resources.

1.4 Property Description and Tenure

The Idaho-Maryland property is 1.5 miles from the center of Grass Valley, Nevada County, in north-central California. The property comprises approximately 2,750 acres of mineral lands, with 37 acres of surface rights centered around the New Brunswick shaft, 101 acres of surface rights west of the Idaho shaft, and a one-acre easement on the Round Hole Shaft property. The 101 acre site is called the Idaho-Maryland property. The mineral rights are defined as sub-parcels in a Quit Claim Deed. The mineral rights are restricted to a variable depth from surface and are generally contiguous below 200 ft from surface. Idaho-Maryland has an agreement with the mineral rights holders (BET Group) that include a mining lease and an option to purchase both the 56 and 37 acre properties. The term of the lease agreement is five years commencing 1 June 2002. During the term of the lease agreement, any production from the property will be subject to a 3% Net Smelter Royalty (NSR).

1.5 Mining

An underground mine plan has been developed to extract the industrial minerals resource at the Idaho-Maryland mine using modern mining methods and simultaneously provide access to underground gold exploration targets and known gold resources.

Feed material for ceramics production will come primarily from room-and-pillar stopes located 500 ft or more below surface. The decline and ancillary development will also provide ceramic feed material. The decline has been placed such that it will also provide an excellent drill platform for exploration of the known gold resources and additional exploration targets within and adjacent to the historic Idaho-Maryland workings.

The ramp access will be driven as two declines separated by a 60 ft pillar. This will allow one decline to be used for fresh air and the other for exhaust, providing ample ventilation without the need for a major ventilation raise until a connection can be established with the Brunswick mine workings.

To reduce the potential for higher noise levels on surface, a temporary crusher for ceramic feed material and development rock will be installed underground at 1,000 ft from the portal and within a year after portal excavation begins. Until this time, movement of trucks and crushing of ceramic feed material on surface will be confined mostly to daylight hours.

The temporary crusher will supply the surface stockpiles until a permanent crusher can be located at greater depth. The permanent crushing installation will be operational roughly three years after the start of the decline at a depth of 900 ft below surface. Like the temporary crusher, it will supply surface stockpiles via a 36" conveyor. Also, in consideration of noise levels on surface, the underground coarse ore bin and crusher have been sized to supply full production feed operating one shift per day.

Ground conditions in the area of the ceramics feedstock resource are expected to be very good. Room-and-pillar mining has been selected as the long-term mining method because it is responsive to changes in ground conditions, and the equipment and workforce requirements are similar to those for tunneling. The method is based on personnel entry so the underground openings will be smaller than with other bulk mining methods.

No backfill is planned after extraction of the ceramics feedstock/industrial minerals resource. Pillars have therefore been designed with high safety factors, and recovery is planned at roughly 25% of the resource. Rock pillars have been designed to remain stable indefinitely.

Room-and-pillar mining for ceramic plant feed may start at 500 ft below surface roughly three years after the start of the underground decline. By this time, the permanent crushing and conveying installation will be operational. Ceramics production is scheduled to ramp up gradually from 1,200 ton/d to 2,400 ton/d over the course of three years from initial plant start up.

The dewatering of the mine workings from the New Brunswick Shaft will be required to eliminate the risk of water pressure transmitted through diamond drill holes penetrating areas close to the old mine workings and will be required in advance of a breakthrough into old mine workings.

Surface exposure of underground workings will be limited to the portal, which will be covered with a culvert and four raises for ventilation and emergency exit from the mine.

1.6 Process

1.6.1 Mineral Processing

The development scenario for the Idaho-Maryland ceramics project will see an initial production rate of 1,200 ton/d, increasing to 2,400 ton/d at the start of Year 4 after initial plant start-up.

1.6.2 Crushing, Drying, and Grinding

The feed material for the ceramic production will consist primarily of meta-volcanics. Run-of-mine (ROM) ceramics plant feed material will be crushed in an underground crusher and conveyed to two crushed material stockpiles on surface adjacent to the process plant. Crushed ore will be drawn from the stockpiles by reclaim feeders and fed to the secondary/tertiary crushing plant. Crushing circuit product will then be passed through a rotary kiln drier to reduce the moisture content to 1% prior to a single stage of grinding in a high-pressure-grinding roll (HPGR). The ground product will be classified in a dynamic separator with a target final product particle size of 80% passing 150 µm. The sized product will be conveyed to a series of storage silos adjacent to the ceramics plant and will be segregated depending on the mineralogical composition and the final ceramic product required.

Although the initial Phase 1 ceramic plant capacity will be 1,200 ton/d, the secondary and tertiary crushing circuit will be constructed with a capacity of 2,400 ton/d, which will be sufficient for Phase 2 ceramic production rate. The initial high-pressure grinding roll will have a capacity of 1,200 ton/d, and a second grinding roll circuit will be installed for the expansion to 2,400 ton/d. Primary underground crushing and conveyor transport to the surface stockpile will take place on dayshift only to minimize noise levels during non-daylight hours. The secondary/tertiary crushing and grinding circuits will be completely enclosed in an insulated building to minimize external noise levels. This will permit these circuits to operate 24 h/d.

1.6.3 Ceramics Production

Ceramics manufacturing will utilize the proprietary Ceramext™ process, which is based on high temperature vacuum extrusion to produce high-strength, low porosity industrial ceramics such as floor tile, roof tile, brick, and other construction materials. Ceramic feed material will be drawn from the silos and conveyed to a set of blenders used to mix predetermined quantities of feed material for different end products. From the blenders, the feed material will be conveyed to screw feeders used to meter feed material to a bank of pre-heaters. Each pre-heater will feed multiple ceramic manufacturing lines and will serve to drive off remaining moisture as well as heating the material for the ceramics process. Upon exiting the pre-heaters, the material will be fed into the extrusion and forming process. From the extrusion and forming process, the shaped pieces will be directed to a glazing process or to the cooling furnaces. The cooling furnaces provide a controlled temperature environment to reduce the ceramic product to ambient temperature.

From the cooling furnaces, products will be machine stacked. Flat tile products will be boxed, strapped, and palletized. Shaped tile products, brick pavers, and block will be strapped and palletized. All packaging operations will be fully automated. Packaged products will be delivered to either indoor or outdoor storage to await customer delivery. The Ceramext™ equipment is patented, the process patent is pending and additional patents are being prepared for further protection and commercialization of the intellectual property. A copy of the patent is in Appendix A. The Ceramext™ process has been successfully tested at the pilot plant level. However, at this point, there is no full-scale production unit in operation.

Dr. Carl Frahme, an independent consultant and the designated Qualified Person for the ceramic portion of the project, has evaluated the technical and economic aspects of the Ceramext™ project. He has concluded that the Ceramext™ process is technologically sound, that its basic premise of high temperature extrusion has been validated and demonstrated, and that production of competitive ceramic has the potential to be feasible. His economic evaluation indicates that the process may achieve lower production costs and produce superior products when compared to existing technology currently in use, and is economically attractive and viable. He also evaluated the market for products that could be produced by the process, and has determined that the markets are large and that market entry and penetration do not offer large obstacles.

1.6.4 Gold Processing (*Future*)

Should a commercial gold resource ultimately be defined, the crushing and grinding circuits installed for the ceramics process will also serve to crush and grind ore for the gold recovery process. Furthermore, the overall process route would be modified so that the product from the grinding circuit would report first to the gold recovery circuit. The final process tails from the gold circuit would then be treated to remove residual cyanide, dewatered, dried, and then fed to the ceramics process.

The gold ore would be crushed and then ground to 80% passing 150 µm particle size. Gravity concentration and flotation circuits would be used to produce gold concentrates. The concentrates would be leached in an intensive cyanidation circuit to extract gold, and the gold would be recovered from the leach solutions by precipitation in an electrowinning circuit. The gold would be smelted on site to produce doré, which would then be transported off-site to a custom refiner to produce refined bullion. Barren solid residue from the intensive leach process would be rinsed to remove residual cyanide, and then transported off site to a custom treatment facility.

Tailings from the process plant would be dewatered to recover water for reuse in the process. All material that has come into contact with cyanide would be treated to destroy any remaining cyanide. Dewatered tailings material in excess of that required for backfill in the gold mine would be used for ceramics production.

As the process tailings would be consumed in the ceramics manufacturing process or used for backfill in the underground mine, there would be no need for a surface tailings containment system.

1.7 Site Facilities

The Idaho-Maryland project consists of three general areas: the 101 acre Idaho-Maryland site property adjacent to the Idaho shaft, the 37 acre Brunswick property surrounding the

New Brunswick shaft, and the 1 (one) acre easement on the Round Hole Shaft property. The bulk of the new facilities will be constructed on the Idaho-Maryland property. These facilities will include the decline portal, vent raise, escape raise, ore stockpiles, storm water detention and mine water sedimentation ponds, process plants, warehouse, truck shop, electrical substation, mine dry, administration building and visitors center.

It is planned to construct certain facilities on the Brunswick property as part of the proposed gold exploration program. These facilities will include hoist house, headframe and hoist, pump system for mine dewatering, mine water treatment system, power supply substation and emergency generator/compressor house.

The Round Hole shaft may be used in the future as a ventilation shaft and emergency access shaft.

The proposed location of the decline portal is toward the west side of the Idaho-Maryland property. Services feeding the decline will be electric power, fresh water, discharge water, communications lines, and compressed air pipelines. The escape raise will be positioned in the southeast corner of the Idaho-Maryland property, and the ventilation shaft will be located in the northeast corner.

A high voltage powerline located within a quarter mile of the Idaho property will supply the site with power. The average power demand for the mine, ceramics manufacturing plant and ancillary facilities will be approximately 9200 kW at the 1,200 ton/d production rate. At the increased production rate of 2,400 ton/d the power demand will increase to 18,500 kW. Natural gas for the rotary kilns and ceramics process heating will be supplied via a pipeline to the site.

Fresh water will be supplied from the Nevada Irrigation District (NID) water supply. Process water will be drawn as reclaim water from the mine dewatering system.

The existing mine workings will be dewatered via a pumping system in the New Brunswick shaft. The water will be treated to remove dissolved iron and manganese and any other metals, and will meet state and federal water quality standards prior to release to the South Fork Wolf Creek. Iron and manganese residues recovered during water treatment will be collected for recycle to the ceramics process.

Other metal residues, if present, will be collected and transported off-site for treatment and/or storage.

1.8 Permit Application Requirements and Status

A Conditional Mine Use Permit (use permit) is required in order for Idaho-Maryland to continue with the underground exploration, and development of the Idaho-Maryland deposit.

Emgold through its subsidiary, Idaho-Maryland Mining Corporation has been successful in obtaining all permits applied for to date regarding the exploration and development of the Idaho-Maryland project. Idaho-Maryland is currently preparing separate applications for permits to further exploration, development and operation of the mine.

Idaho-Maryland is currently applying for a use permit to conduct another surface core drilling exploration program. Surface exploration programs have and will continue to consist of diamond drilling to expand the understanding of the project geology and identify underground exploration targets. Separate drilling permits will be required to conduct the surface exploration drilling programs.

A use permit will be required to conduct the underground diamond drilling exploration and mine development programs. This use permit will also include the construction of the decline, dewatering of existing mine workings, mine development, construction of surface facilities including processing and support facilities, and ultimately closure and reclamation activities. The application for the use permit will incorporate a phased development program in order to streamline the permitting process while at the same time, retaining the option to evaluate the project on completion of underground drilling and exploration activities. If the results from both the surface and underground exploration meets expectations, Idaho-Maryland may proceed with further development, production and operation under the same use permit.

Granting of the use permit for the mineral resource development program will require a zoning designation and general plan amendment from the City of Grass Valley to allow for mining operations. Such actions require a use permit application be submitted to the lead agency, which will trigger the California Environmental Quality Act (CEQA) process.

In addition to CEQA, the following environmental laws are applicable to the project: Surface Mining and Reclamation Act (SMARA, 1975), Clean Water Act (CWA, 1972), and Clean Air Act (CAA, 1972).

Idaho-Maryland commissioned MACTEC Engineering and Consulting, Inc. (MACTEC) of Petaluma, California, to complete a Conceptual Development Review Application for the Idaho-Maryland mine project. This document was completed on 28 July 2004 and has been received by Idaho-Maryland management. This document was submitted to the City of Grass Valley on 30 July 2004. An initial response from the City of Grass Valley has been received by Idaho-Maryland and Idaho-Maryland is now preparing the final conditional mine use permit application for submission to the City of Grass Valley.

1.9 Environmental Considerations

Idaho-Maryland contracted MACTEC to complete a Phase 1 Environmental Site Assessment of the WestBet property (also referred to as the Idaho-Maryland). The investigation did not identify evidence of recognized environmental conditions. A due diligence site investigation was completed by MACTEC on the adjoining Brenner property (formerly known as the Lausman) and evidence of recognized environmental conditions was observed. The environmental concerns on the Lausman property relate to a log pond and an underground fuel storage tank. Subsequent to the performance of the investigation, Idaho-Maryland purchased the property under a joint venture agreement with Milco Development. Under the terms of the agreement, Idaho-Maryland owns the southern 45 acres of the 67 acre property and Milco owns the remaining portion. The log pond is located entirely on the Milco property. The underground fuel storage is located entirely on the Idaho-Maryland property. Remediation of the underground fuel storage is currently underway.

The Phase I Environmental Site Assessment is preliminary in scope and MACTEC recommends more detailed assessment including testing on samples of soil and groundwater.

Virtually all of the building structures related to the historic mine operations on the Idaho-Maryland property have been removed. The only physical structures remaining are two concrete towers previously used for the deposition of mine tailings. Idaho-Maryland management has stated that the company may be responsible for any environmental liabilities pertaining to the former mine operations.

Due to its proximity to the City of Grass Valley, the proposed design has taken into consideration noise levels generated by the operation. During the initial development of the underground mine access, haul trucks will transport rock to a temporary primary crusher on surface for a period of approximately one year. Hauling and crushing activities will be restricted to daylight hours during this period. The primary crusher will be relocated underground and a conveyor installed once sufficient mine development has been completed. Conveying of rock to surface will be conducted only during daylight hours.

Once the surface plant facilities are constructed, most of the industrial operations with the exception of the crushed rock stockpiles will be housed within fully enclosed and insulated buildings. This will serve to maintain low external noise levels. As the mine is underground, virtually all mine-related operations will be underground and noise will not be a factor.

Significant effort will be made to minimize the physical and visual impact of the project on the environment and community. Existing waterways will be preserved. Impact on existing vegetation will be minimized. Current architectural codes will be strictly adhered to. Visual sight lines will be taken into account in the layout of the project site. Surface exposure of underground workings will be limited to the portal, which will be covered with a culvert, and four raises required for ventilation and emergency exit from the mine.

1.10 Marketing and Sales Approach

Based on the 1,200 ton/d feed rate, the ceramics plant could produce approximately 160 Mft^2/yr of tile. This represents approximately 5% of 2003 US tile consumption and 35% of 2003 California consumption. The second stage of mine development would double this production level to approximately 320 Mft^2/yr.

Given the superior properties of tile and other products expected using Ceramext™ technology, the proposed market strategy would be to compete in the higher ends of the marketplace. For ceramic tile, this would include vitrified floor tile and porcelain tile products. These products command higher retail prices and represent the major share of the market growth in recent years. Target markets would include large commercial projects (malls, commercial office space, restaurants, civic projects) and upscale home floor, wall, and countertop installations, for both new construction and renovation. Factory selling prices in the $1.00/$ft^2$ to $1.50/$ft^2$ are expected based on current market experience.

A number of marketing and sales channels are available, including factory direct showrooms, independent distributors, and large retail stores. An assessment of the marketing channels is warranted to identify the optimum marketing and sales approach.

1.11 Capital Cost Estimate

The estimated capital cost for development of the mining, process, and ancillary facilities to achieve a production rate of 1,200 ton/d is $195,914,000. The estimated additional capital cost for the expansion of the mine and process plant to achieve a production rate of 2,400 ton/d is $154,652,000. The total estimated mine and plant capital cost is $350,566,000. The costs are based on 4th quarter 2004 US dollars. The estimate should be considered as conceptual with a probable accuracy of ±35%.

The capital cost estimate includes:

- permitting
- mine development and equipment
- process plant and ancillary facilities

- contingency
- Owner's costs
- working capital.

Separate from the ceramic mine and plant project cost, an additional $43,000,000 has been included to complete dewatering and rehabilitation of the Brunswick mine workings, and to perform a gold exploration program primarily in the areas of the previous Brunswick and Idaho-Maryland workings, and complete a feasibility study on the gold project.

The total project capital cost including mine, plant, mine dewatering, rehabilitation of existing Idaho-Maryland mine workings, and gold exploration program is $393,566,000.

1.12 Operating Cost Estimate

The estimated project operating costs are presented in Tables 1-3 and 1-4. The mine operating costs are based on unit costs and manpower levels typical of other underground mines of similar scope with the notable exception that access drives provide feed to the process plant and therefore the cost per ton is much lower. The processing costs are comprised of two major components; 1) crushing, drying, and grinding; 2) ceramics processing. The crushing, drying, and grinding costs are based on typical industry costs for plants of similar scope. The ceramics processing costs have been provided by Idaho-Maryland and must be considered conceptual, as there are no plants in operation using this technology on which to base the estimated costs. The G&A costs have been based on other mining projects of similar size.

Table 1-3: Operating Costs by Year $/ton of Feed Processed

	Pre-Production		Expansion				Full Production					
	Year 1	Year 2 Q1 + Q2	Year 2 Q3 + Q4	Year 3	Year 4	Year 5 Q1 + Q2	Year 5 Q3 + Q4	Year 6	Year 7	Year 8	Year 9	Year 10
Tons/d			*1,200 t* *	*1,200 t* *	*1,200 t* *	*1,200 t* *	*2,400 t* *	*2,400 t*	*2,400 t*	*2,400 t*	*2,400 t*	*2,400 t*
Mining	-	-	20.28	28.87	34.90	40.93	26.10	30.21	30.81	29.68	30.09	28.75
Process	-	-	97.07	97.07	97.07	97.07	90.22	88.22	88.22	88.22	88.22	88.22
G&A	-	-	7.01	7.01	7.01	7.01	3.50	3.50	3.50	3.50	3.50	3.50
Total	-	-	124.36	132.95	139.97	145.01	119.82	121.93	122.53	121.40	121.81	120.47

* plant feed is combination of mined production and temporary stockpile reclaim

Table 1-4: Operating Costs by Year $/ft^2 of Ceramic Product

	Pre-Production		Expansion				Full Production					
	Year 1	Year 2 Q1 + Q2	Year 2 Q3 + Q4	Year 3	Year 4	Year 5 Q1 + Q2	Year 5 Q3 + Q4	Year 6	Year 7	Year 8	Year 9	Year 10
Tile production			160,754,000 ft^2/yr				321,507,000 ft^2/yr					
Mining	-	-	0.05	0.07	0.09	0.10	0.07	0.08	0.08	0.08	0.08	0.08
Process	-	-	0.25	0.25	0.25	0.25	0.23	0.22	0.22	0.22	0.22	0.22
G&A	-	-	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Total	-	-	0.32	0.34	0.36	0.37	0.31	0.31	0.31	0.31	0.31	0.31

1.13 Financial Analysis

The preliminary financial analysis for this project is presented in Tables 1-5 and 1-6. Based on the parameters and assumptions incorporated into this assessment, the analysis indicates a positive financial return on this project. California sales tax has been included in the analysis.

The inputs to the model were generated by AMEC and Idaho-Maryland to a scoping study level of accuracy. The model used a discounted cash flow (DCF) analysis to determine the pre-tax net present value (NPV) and the pre-tax internal rate of return (IRR) for the project.

Table 1-5: Scenario A NPV at Varying Discount Rates and IRR)

	0%	10%	20%	30%	40%
NPV (US$ '000)	3,706,755	1,111,143	392,891	139,238	32,893
IRR (%)	45.8	-	-	-	-

Table 1-6: Idaho-Maryland Estimated Capital, Annual Production Costs and Sales at Average Conditions

Daily Feed Rate (ton/d)	Capital Expense (US$ M)	Estimated Tile Production (Mft^2)	Projected Sales[1] (US$ M)	Production Costs (US$ M)	Direct Profit[2] (US$ M)
1,200	196	160	192	77	115
2,400	155	320	384	139	245
CA Sales Tax	10	-	-	-	-
Total	361	-	-	-	-

Note: 1 \$1.30 ft^2. **2** Excludes income taxes, dewatering and rehabilitation of existing Idaho-Maryland mine workings and gold exploration.

1.14 Project Schedule

The project schedule consists of five distinct stages: 1) securing permits and completion of feasibility study, 2) detail engineering, 3) driving of a decline to the industrial minerals mining area and development of initial mine excavation areas and exploration drill stations, 4) construction of the surface process and ancillary facilities, and 5) expansion of the mine production and surface process plant capacities.

Securing of permits and completion of a feasibility study is expected to require up to 24 months after submittal of the Conditional Mine Use Permit application. Detail engineering and development of the mine, construction of the surface plant and facilities is scheduled to require an additional 18 months. Overall, the implementation is estimated to be 36 to 42 months from submittal of the permit application to the start of production for the 1,200 ton/d project.

The expansion to 2,400 ton/d is projected to be completed 36 months after the initial start of the 1,200 ton/d processing plant.

1.15 Conclusions and Recommendations

This Preliminary Assessment Report was completed to assess at the conceptual level the economic potential to develop an industrial minerals mine and establish an associated ceramics production facility while providing underground access for gold exploration and resource definition. A key parameter to the viability of the project is the commercial application of the new, proprietary Ceramext™ technology. The findings of this preliminary assessment are based entirely on the assumption that the technology may ultimately be successfully applied in a commercial application.

Recognizing the assumption and limitation stated above, the findings of the Preliminary Assessment indicate that the general concept of development of an industrial minerals mine and an associated ceramics production facility appears to warrant further development and study.

AMEC has identified a number of recommendations for this project. The recommendations are presented in Section 20.2.

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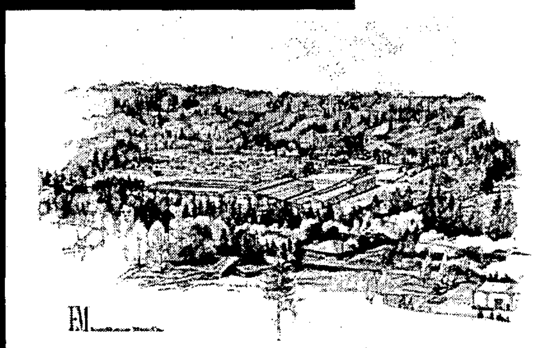

SECTION 2

Introduction and Terms of Reference

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2.0 INTRODUCTION AND TERMS OF REFERENCE

2.1 Introduction

Idaho-Maryland retained the services of AMEC Americas Limited (AMEC) to evaluate the potential of a ceramics project on the Idaho-Maryland property and to report the findings in a Preliminary Assessment report. AMEC has completed two previous evaluations of the property based on the gold mining potential. The first was an independent Qualified Person's review and evaluation in the form of a Technical Report as defined in National Instrument 43-101, Standards of Disclosure for Mineral Projects in November 2002. The second was a Scoping Study, dated January 2003.

The overall development plan for the Idaho-Maryland project envisions the following three major components:

1. Development of a decline to access underground drill stations for gold exploration

2. Construction of a commercial ceramics production facility which will utilize development rock from the decline and rock from an underground room-and-pillar mine as initial feed material

3. Upon delineation of an economic gold resource, establishment of a gold mining and processing operation, integrated with the ceramics process so that gold process tailings would combine with mine rock as the feedstock for the ceramic process

Previous work by Emgold focused on identifying and developing the gold resource at the property with the objective of establishing a commercial gold mine. Idaho-Maryland management plans to continue pursuing development of the gold resources through further surface and underground exploration; however, underground exploration can only proceed after a Conditional Mine Use Permit is received from the City of Grass Valley. Obtaining this permit depends on acceptance of the project by the City of Grass Valley and Nevada County. In the event of planning and establishing a mining operation, the satisfactory management and treatment of all development rock and tailings from any underground exploration, mining, and recovery process would be critical to this acceptance.

In response to this, Idaho-Maryland management identified and licensed a new technology that offers the potential to utilize the decline development rock and gold process tailings for the production of ceramic building products. The trade name for the technology is Ceramext™. Successful application of the Ceramext™ technology would see all the mine development rock and gold process tailings consumed thereby eliminating the requirement for long-term surface storage of these materials.

Upon identification of the Ceramext™ technology, Idaho-Maryland technical personnel also investigated the possibility of establishing a commercial industrial minerals mine on the Idaho-Maryland property. Their investigation led to the identification of a significant mineral deposit, the Brunswick Slab, within the Idaho-Maryland property boundaries that would provide suitable feed for the Ceramext™ process.

Application of the Ceramext™ technology combined with the suitability of the Brunswick Slab rock as feed material to the ceramics process may provide a business case for production of high-quality ceramic building materials. The successful production and sales of ceramic materials would allow Idaho-Maryland to continue with exploration, definition, and development of potential gold targets, with the objective to identify an economic gold reserve while generating positive cash flow from the ceramics development.

The industrial minerals mine will have an initial production rate of 1,200 ton/d, expanding in stages to an ultimate capacity of 2,400 ton/d by the end of the third year.

This study may be used to guide future work on the development of the project as well as to provide a development scenario for preparation of the use permit application. The study has been completed to a scoping level of accuracy. Facilities included in the scope are underground mine operations, a ceramics manufacturing facility, and ancillary plant and infrastructure.

Emgold through its wholly owned subsidiary, Golden Bear Ceramics Company, has signed an exclusive world-wide license agreement with Ceramext™, LLC to develop and use the Ceramext™ Process to convert mine development rock, tailings, waste and other naturally occurring materials into high quality ceramics. The Ceramext™ Process is a patented, energy-efficient, one-step technology capable of converting a wide variety of raw materials, including mine tailings and fly ash into high-strength, low-porosity, industrial ceramics such as floor tile, roof tile, brick, construction materials and other industrial and commercial products.

2.2 Terms of Reference

AMEC obtained information and data for the study from the Idaho-Maryland project site during visits between 3 and 11 October 2002, 3 and 4 June 2004, 24 August to 1 September 2004, and on 29 October 2004. Information was also obtained from a Scoping Study completed by AMEC in January 2003 for Emgold, which assessed the potential to establish a gold mining and processing operation. Additional information was obtained from Emgold's head office in Vancouver, BC.

Idaho-Maryland and Emgold provided AMEC with the following information:

- overall project scope
- capital and operating costs for the Ceramext™ process and plant facilities
- manpower level for the Ceramext™ manufacturing facility
- general and administration (G&A) costs
- property ownership and location details
- historical and current gold resource and industrial minerals resource data
- labor rates as determined by Western Compensation and Benefits Consultants.

Pertinent data were reviewed in sufficient detail for the preparation of this document. The following AMEC personnel provided Qualified Person review:

- Sean Waller, M. Sc., P. Eng. Acted as study manager and provided input and/or review on crushing and grinding process design, capital and operating cost estimates relating to crushing, grinding, certain infrastructure and site services (Sections 16, Sections 19.3 to 19.5, and Sections 19.7.1 and 19.7.2). Mr. Waller has not visited the site.
- Stephen Juras, Ph. D., P. Geol. Reviewed geologic data, mineralogy and resource estimates as well as sample handling protocols (Sections 7 – 13, Section 17). Dr. Juras also visited the site on 3 to 4 June 2004 and 29 October 2004 as part of this preliminary Assessment. Dr. Juras had previously visited the site during the period of 3 to 11 October 2002 as part of a previous Preliminary Assessment performed by AMEC.
- Mr. Joe Ringwald, P. Eng. Reviewed the underground mine design and costs (Sections 19.1, 19.3, 19.4, and 19.7.1). Mr. Ringwald has not visited the site.

Additional Qualified Person assistance was provided by the following persons:

- For all technical, financial and marketing information pertaining to the Ceramext™ technology and process, and ceramics marketing, AMEC has relied on information supplied by Dr. Carl Frahme, Ph.D. (Sections 16.1.2,16.3.1, 19.3.3, 19.4.3, 19.7.2) AMEC understands Dr. Frahme is an independent consultant with recognized expertise in ceramics manufacture and marketing. Dr. Frahme is currently an independent consultant to Idaho-Maryland and Golden Bear Ceramics Company.
- For environmental information pertaining to the project site, AMEC has relied on information supplied by Patricia Nelson, Thomas Graham and Matthew Walraven of MACTEC Engineering and Consulting, Inc. AMEC understands that Ms. Nelson, Mr. Graham and Mr. Walraven are suitably qualified environmental scientists and that MACTEC is a recognized consulting firm with expertise in the environmental sciences. Ms. Nelson visited the site on numerous occasions. Mr. Walraven visited the site on

September 13, 2004 and Mr. Graham visited the site on 2 and 3 August 2004. (Section 4.0).

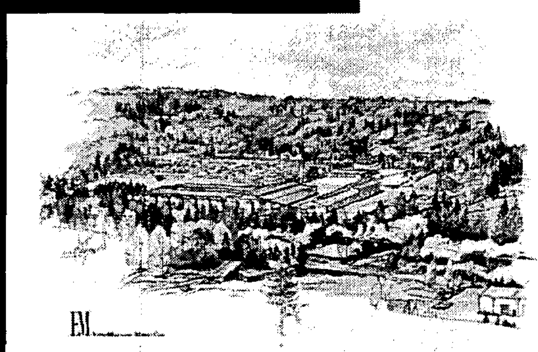
The Ceramext™ process is a key parameter to the potential technical and economic viability of the project. This is a new, proprietary, patented process currently under development but at this point not proven in a commercial application. All information and data concerning the Ceramext™ process were provided by Emgold, Idaho-Maryland management, and Dr. Carl Frahme, independent consultant of Emgold's wholly owned subsidiary Golden Bear Ceramics Company.

Unless otherwise stated, all costs in this report are expressed in 4th quarter US dollars.

PRELIMINARY ASSESSMENT
TECHNICAL REPORT

Idaho-Maryland Mining Corporation

SECTION 3



Disclaimer

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3.0 DISCLAIMER

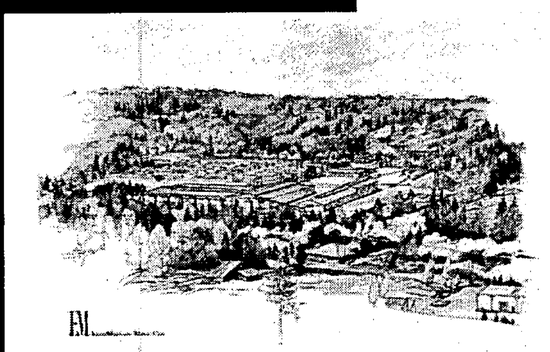
The Ceramext™ technology is a new, patented and proprietary technology. At this point, there are no commercial installations utilizing this technology. With regard to all aspects of the Ceramext™ technology, Ceramext™ costing and ceramic products marketing, AMEC has relied on information provided by Dr. Carl Frahme, an independent consultant with specific expertise in ceramics manufacturing and marketing. AMEC has done so under the assumption that Dr. Frahme is a Qualified Person under NI 43-101 guidelines. Furthermore, AMEC has relied on information provided by Dr. Frahme for the definition of mineralogy suitable for processing with the Ceramext™ technology.

For environmental information pertaining to the project site, AMEC has relied on information supplied by Patricia Nelson and Thomas Graham of MACTEC Engineering and Consulting, Inc. AMEC understands that Patricia Nelson and Thomas Graham are suitably qualified environmental scientists and that MACTEC is a recognized consulting firm with expertise in the environmental sciences.

AMEC also relied on a legal report entitled "Legal Title Opinion prepared for the Core Area Properties of the Idaho-Maryland Mine Project, Grass Valley Mining District, Nevada County, California" (Galati & Associates, 1997) for its review of title and mineral rights. The report was used based on the assumption it was prepared by a Qualified Person.

PRELIMINARY ASSESSMENT
TECHNICAL REPORT

EMGOLD Idaho-Maryland Mining Corporation



SECTION 4

Property Description and Location

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4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 Location

The Idaho-Maryland project property is 1.5 miles east of the center of the City of Grass Valley, Nevada County, in the State of California (see Figures 4-1 and 4-2). The property lies primarily between the Idaho-Maryland Road, Brunswick Road, and State Route 174 and consists of approximately 2,750 acres of mineral lands, with 37 acres of surface rights centered around the New Brunswick shaft, and 101 acres of surface rights west of the Idaho shaft, and a one-acre easement on the Round Hole Shaft Property. The 101 acres of surface rights include a 56 acre parcel and an adjoining 45 acre parcel lying immediately to the east. The 56 and 45 acre sites are collectively called the Idaho-Maryland property. The mineral lands comprise portions of Sections 19, 29, 30, and 31 in T16N R9E and portions of Sections 23, 24, 25, 26, 36 in T16N R8E. The site plan is shown on Dwg. 100-C-0005 in Appendix B.

The mineral rights are defined as sub-parcels in a Quit Claim Deed and are restricted to a variable depth from surface. In general, the rights are contiguous below 200 ft from surface. Emgold has an agreement with the mineral rights holders (BET Group) that include a mining lease and option to purchase the 101 and 37 acre properties. The term of the lease agreement is five years commencing on 1 June 2002. During the term of the lease agreement, any gold production from the property will be subject to a 3% Net Smelter Royalty (NSR). Idaho-Maryland owns the 45 acre parcel which comprises a portion of the 1001 acre site.

4.2 Jurisdictions

The Idaho-Maryland mine lands are located within the City of Grass Valley and in unincorporated county lands that are designated to be annexed into the city of Grass Valley by 2005. Other project lands, including the New Brunswick shaft, are on Nevada County lands, and are not part of any scheduled annexation. Certain administrative procedures will therefore need to be completed by the city to allow the project property to be developed for mineral extraction:

- General Plan Amendment
- Zoning Designation Amendment
- LAFCO Process.

Such actions require a land use permit application be submitted to the Lead Agency, which will trigger the environmental assessment process required by the State of California as defined in the *California Environmental Quality Act* (CEQA). Other applicable state and federal environmental regulatory requirements are as outlined in Section 4.4.

Figure 4-1: Project Location Map

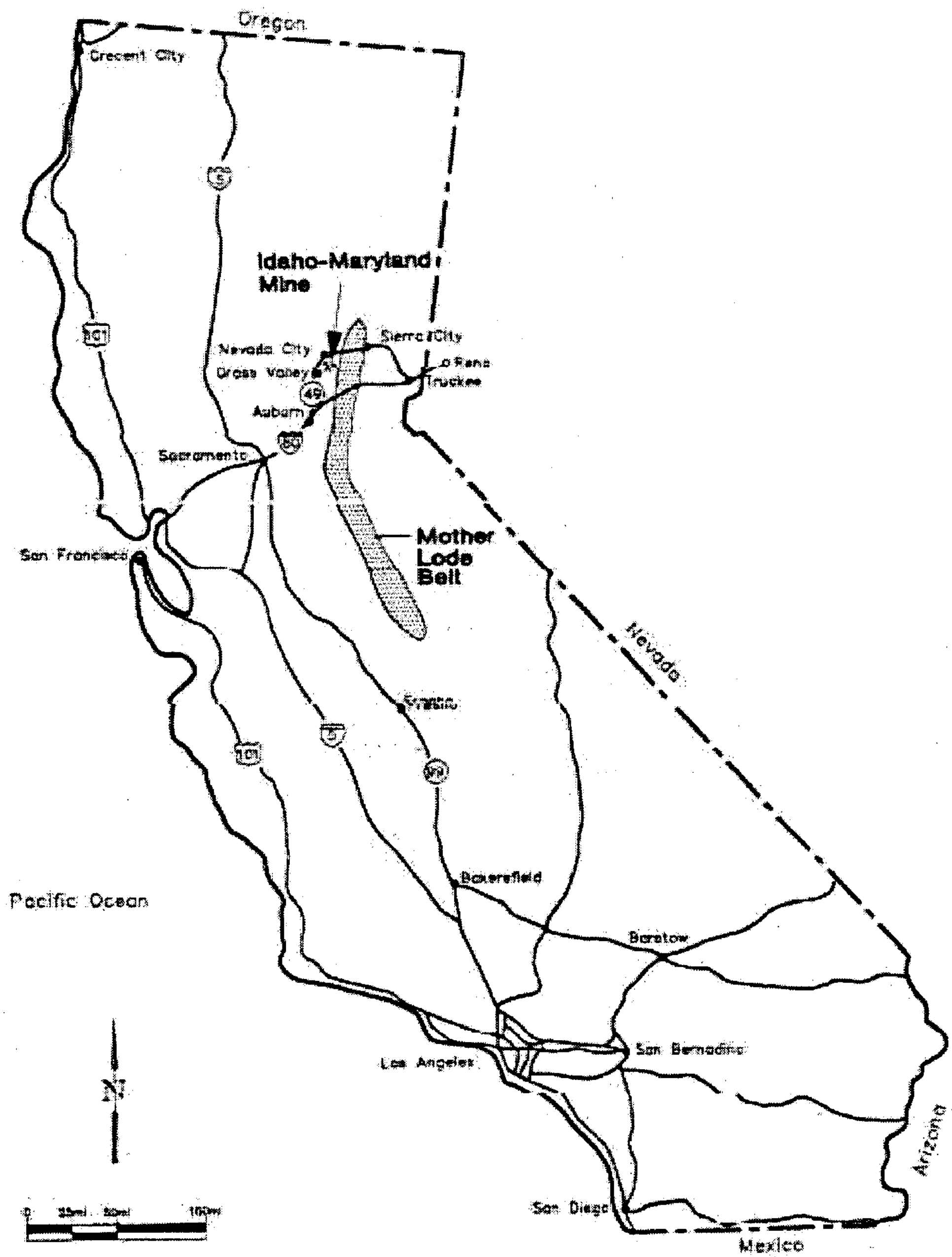
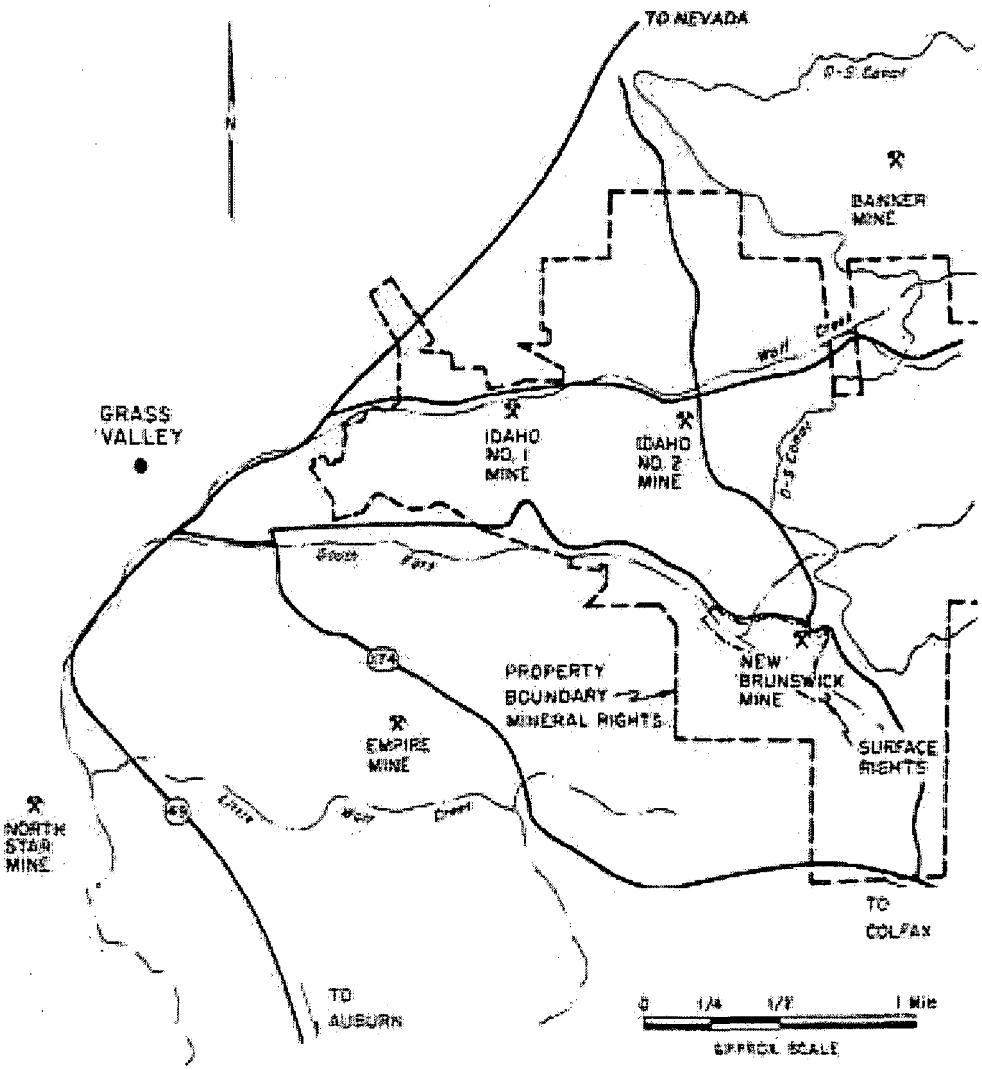


Figure 4-2: Mine Location Map



4.3 Permitting History

In the mid-1990s, Emperor Gold Corporation, the predecessor to Idaho-Maryland Mining Corporation, a subsidiary of Emgold, applied to the Nevada County Planning Department for a use permit to dewater and subsequently explore and sample the existing workings of the Idaho-Maryland mine. On 25 January 1996, the Nevada County Planning Department certified the Environmental Impact Report (EIR) prepared in accordance with CEQA and issued a conditional use permit. In accordance with the permit, the project was to have commenced by 25 January 1998 with completion of dewatering, exploration, and post-project activities by 25 January 2003.

To support dewatering activities, Emperor Gold applied for a National Pollution Elimination Discharge System (NPDES) permit with the California Regional Water Quality Control Board, Central Valley Region (CVRWQCB). On 3 May 1996, a permit was issued allowing Emperor to dewater the Idaho-Maryland mine. The permit was valid for a period of five years and expired on 3 May 2001.

Idaho-Maryland management submitted a "Conceptual Development Review Application" to the City of Grass Valley on 30 July 2004. The City of Grass Valley has reviewed the Conceptual Application and has identified where modification and/or additional information is required. Idaho-Maryland management is currently addressing the requirements for the formal Development Review Application.

The Development Review Application addresses the following items:

- neighborhood site plan
- project site plan
- statistics and descriptive information
- architectural plans
- project site cross sections.

In addition, the application addresses the following issues.

Land Use

- Required by the City of Grass Valley (City) and Nevada County (County)
- Identifies the property boundaries, building locations and setbacks, parking spaces, and proposed land improvements. This information is relevant to the surface development required for the project.

General Plan Amendment

- Required by the City and County
- Describes changes (if any) to the General Plan, how the changes affect the existing policies of the General plan, or how new conditions or community desires warrant changes to the General Plan and how these changes relate to other elements of the General Plan. This information is relevant to the surface development required for the project.

Rezone/Pre-zone

- Required by the City and County
- Describes changes required to applicable zoning regulations and how they conform to the requirements of the General Plan. If General Plan Amendments are required, a description of how General Plan policies are being amended to meet the proposed changes to zoning designations is required. This information is relevant to the surface development required for the project.

Annexation

- Required by the City and County
- Describes current and proposed zoning and land use of the project site and adjacent properties, and provides a statement stating how the property is consistent with the City's Sphere of influence and General Plan. This application must also describe proposed changes to service organizations (i.e., fire and police departments).

Surface Mining and Reclamation Act

- An Exploration and Mining Use Permit is required by the City and County to conform to the requirements of the *Surface Mining and Reclamation Act* administered by the California Department of Conservation, Office of Mine Reclamation. The information developed for this permit application is particularly relevant to the subsurface development required for the project.

4.4 Environmental Laws

The following environmental laws are applicable to the proposed project: the *California Environmental Quality Act* (CEQA, 1970), *Surface Mining and Reclamation Act* (SMARA, 1975), *Clean Water Act* (CWA, 1972), and *Clean Air Act* (CAA, 1972). These laws, their respective purposes, and their applicability to the project are briefly described below.

California Environmental Quality Act

CEQA is regarded as the foundation of environmental law and policy in California. Its primary objectives are to disclose to decision-makers and the public the significant environmental effects of a proposed development and identify ways to avoid or reduce environmental damage.

Typically, when a Lead Agency is notified of a project, the CEQA process is initiated with consideration of the proposed project's environmental characteristics. Because the proposed Idaho-Maryland project involves re-opening a mine that has been inactive for approximately 50 years, for which minimal reclamation, if any, has been performed, an Environmental Impact Report (EIR) will most likely be required under CEQA.

Surface Mining and Reclamation Act

SMARA was enacted to respond to the need for a continuing supply of mineral resources, while preventing damage from mining activities to public health, property, and the environment. The following activities are subject to SMARA: prospecting and exploratory activities, dredging and quarrying, streambed skimming, borrow pitting, and stockpiling of mined materials.

Mining may begin after the lead agency approves the mining permit and a plan for returning the land to a usable condition; this plan is referred to as a *Reclamation Plan* and is required for surface and subsurface mining operations. In addition, a prerequisite to mining activities is the applicant's proof of financial assurances to guarantee costs of reclamation (e.g., surety bonds, irrevocable letters of credit, or trust funds).

Because the proposed project involves reopening a mine that has been inactive for approximately 50 years, for which minimal reclamation, if any, has been performed, a reclamation plan will need to be prepared for the project in accordance with SMARA. Reclamation plans are required for any exploration and mining related activities disturbing greater than 1,000 yd^3; and/or more than 1 acre of land.

Clean Air Act

CAA was first passed to improve the air quality in the United States and has subsequently been amended to set limits on the discharges of certain pollutants.

The CAA includes a permit program for larger stationary or non-point sources that release pollutants into the air. These can include cars, trucks, other motor vehicles, consumer products, and machines used in industry.

Clean Water Act

CWA was enacted to restore and maintain the quality of US waterways.

The General Permit includes provisions for developing a *Storm Water Pollution Prevention Plan* (SWPPP) to maximize the potential benefits of pollution prevention and sediment and erosion control measures at construction sites.

In the case of the Idaho-Maryland project, the planned surface activities (exploratory mining and stockpiling) for areas greater than 1 acre will be subject to the NPDES (National Pollution Discharge Elimination System) and SWPPP processes to ensure they are performed in a manner that is protective of Wolf Creek.

Summary

Because exploratory activities and stockpiling of mined materials are envisioned for the project, these activities and the necessity to plan for the mine's reclamation require that SMARA be addressed in the permitting and CEQA processes. The CWA and CAA issues can be fully addressed in the context of the CEQA analysis but may require that individual permits for certain mine operations be obtained from the administering agency. Because the proposed mine site is located between two reaches of Wolf Creek, the regulatory requirements for waste streams generated from the mine operations will focus on compliance with CAA and CWA.

4.5 Permit Requirements

Two aspects to the project need to be addressed in the permitting process: 1) those requirements for a surface exploratory phase that will facilitate definition of the mineral resources and 2) those requirements for development of the mineral resources combined with underground exploration and surface processing.

4.5.1 Permitting History

Idaho-Maryland has obtained permits previously for surface exploration drilling and for proposed underground exploration including the dewatering of historical mine workings. Table 4-1 shows these permits.

Table 4-1: Permits

Permit	Lead Agency	Date of Permit
Use Permit-Surface Drilling No. UP03-02	City of Grass Valley	21 May 2003
Conditional Use Permit No.U94-017	County of Nevada	26 January 1996
NPDES/Waste Discharge Requirements No. 96-098	California Regional Water Quality Control Board	3 May 1996

The use permit for the year 2003 surface drilling was subsequently extended for a six month time period by the City of Grass Valley. The year 1996 conditional use permit was approved for the dewatering and underground exploration of the historical Idaho-Maryland mine workings, and the NPDES/WDR permit was the dewatering permit issued by the State for that project. That dewatering/underground exploration project was not undertaken because of depressed commodity and equity market conditions at that time.

4.5.2 Annexation and Permitting Authority

Idaho-Maryland's properties include lands under jurisdiction of the City of Grass Valley and also lands that are under the jurisdiction of Nevada County, some of which are planned to be annexed to the City by year 2005. This jurisdiction applies to the permitting process, and who becomes the lead agency. If a memorandum of understanding is signed between the City and the county, the City of Grass Valley will become the lead agency for Idaho-Maryland's permitting activities on parcels that would otherwise be under County jurisdiction.

4.5.3 Use Permit for Exploratory Work

The scope of the exploratory work has and may continue to entail drilling exploratory boreholes from various surface locations (with multiple drill holes at each location). One prior permit was obtained for surface exploration drilling of the Idaho-Maryland property through the City of Grass Valley. That permit took three months to obtain through a negative declaration process that did not necessitate the preparation of an EIR. Idaho-Maryland may conduct future surface exploration on lands under City jurisdiction, with the City as lead agency. These permits would be obtained on an as-needed basis and would consider issues relevant to drilling, such as surface disturbance, noise, water handling and reclamation. These issues would require review under CEQA, which may involve the preparation of an Initial Study and Negative Declaration (IS/ND) and take up to six months to complete. If the surface area to be disturbed is less than 1 acre and involves less than 1,000 yd^3 of material being processed off-site, a reclamation plan would not be necessary under SMARA (considered to be a CEQA action in its own right). This work may be an allowable action with a grading permit (which would take up to six weeks to obtain).

4.5.4 Use Permit for Mineral Resource Development

The mine development and underground diamond drilling exploration program will require comprehensive CEQA review and permitting through the City as Lead Agency. The first step in the permit process is filing a completed Formal Development Review, General Plan, Pre-zone/Re-zone, Annexation and SMARA permits application with the City. Before a permit may be approved, the environmental issues associated with the project development must be addressed and would include, at a minimum:

- preparation of an Environmental Impact Report (EIR) in accordance with CEQA
- preparation of a Reclamation Plan in accordance with SMARA
- application for and issuance of a Discharge Permit for mine dewatering from the CVRWQCB in accordance with the CWA
- application for and issuance of an NPDES permit from the CVRWQCB in accordance with the CWA
- application for and issuance of either a permit to construct or Title V permit from the NSAQMD in accordance with the CAA.

Approval of such permits is often dependent on the completion of the CEQA process. At this time it would appear that the following environmental issues would need to be addressed in a CEQA process after a permit for development is filed with the lead agency:

- Land Use Issues – General Plan Amendments, Zoning Amendments, Local Agency Formation Commission (LAFCO) for annexation of county land into the City of Grass Valley, reclamation planning
- Noise – Use of explosives, equipment use
- Traffic and Circulation – Direct (mine) and indirect (service) employees (trucks, vehicles)
- Air Quality – CAA / dust generation, non-point sources (machinery/ vehicles)
- Cultural Resources – Potential prehistoric and historic sites
- Geology – Potential for subsidence
- Hydrogeology – Effects of dewatering (viability of private wells)
- Surface Water and Water Quality – use of and potential exposure to hazardous substances/materials, CWA, NPDES/SWPPP
- Biology – Riparian habitat, migratory birds, streambed alteration, if any, as a result of being proximate to Wolf Creek
- Visual – Construction of mine operations area (ore, transfer facilities), development of stockpiles, office buildings for employees

- Public Services – Police, fire, sewer, water, electrical and natural gas to support mine operations (LAFCO)
- Public Health – Use of explosives, effects of subsidence (if any), use of and potential exposure to hazardous substances/materials.

4.5.5 Permitting Period

CEQA Process

The timeframe cited in CEQA in which an EIR is to be completed and certified by the lead agency is one year after the permit application is determined to be complete; such a review under CEQA may require up to 30 days. This time period may be extended by 90 days upon consent of the lead agency and the applicant; generally, the EIR process is to be completed within15 months.

A typical CEQA process may last up to 24 months when there is an iterative cycle in preparing the technical information to address site-specific or seasonal environmental characteristics that may be impacted by the proposed project (e.g., performance of groundwater and soil tests to support dewatering plans or presence of protected migratory birds in the project area).

General Plan and Zoning Designation

In addition to completing the CEQA process, the permit application must also include a proposal to amend the General Plan and Zoning Designation to allow for the Business Park land use designation to be modified to a classification that allows for mining/mineral resource extraction and processing (i.e., industrial). A separate action by the LAFCO is required to annex the project area into the city and will require a separate process that could take between three and nine months thereafter (based on previous communication between AMEC personnel on 16 October 2002, with Mr. Joe Heckel, City of Grass Valley).

Reclamation Plan

A reclamation plan must also be submitted to address SMARA issues for returning the land to a usable condition after mining is completed. Upon approval of this plan, financial assurances will have to be posted before project construction activities can begin.

Summary and Recommendations

It is anticipated that the best-case CEQA process scenario for reopening the Idaho-Maryland mine and fully developing the mineral resources would entail a timeframe of between 12 to 24 months after completion of the project and operational mine plans. In addition, the best-case LAFCO process scenario for the project would involve between three and nine months for annexing county lands into the city to allow for the proposed mining operations. Together, the timeframes comprise a schedule of between 15 and 24 months for environmental and permitting requirements.

4.6 Environmental Status

Idaho-Maryland contracted MACTEC Engineering and Consulting (MACTEC) to complete a Phase 1 Environmental Site Assessment of the WestBet property (also referred to as the Idaho-Maryland). The investigation did not identify evidence of recognized environmental conditions on the property. White crystalline mineral deposits were observed associated with deposits of rock flour fines and clay on the property. MACTEC recommends testing of this material. The details of the MACTEC Phase I Assessment may be found in the following report:

Phase I Environmental Site Assessment, Emgold (US) Corporation. WestBET Property, Centennial Drive and Whispering Pines Lane, Grass Valley, California. MACTEC project No. 4085040502-08, October 14, 2004.

Idaho-Maryland also contracted MACTEC to perform a due diligence site investigation on the adjoining Brenner property (formerly known as the Lausman). The investigation observed evidence of recognized environmental conditions. The most significant environmental concerns on the Brenner property relate to a log pond and underground fuel storage tanks. Subsequent to the performance of the investigation, Idaho-Maryland purchased the property under a joint venture agreement with Milco Development. Under the terms of the agreement, Idaho-Maryland owns the southern 45 acres of the 67 acre property and Milco owns the remaining portion. The log pond is located entirely on the Milco property. The underground fuel storage is located entirely on the Idaho-Maryland property. In addition, there are a number of lesser environmental concerns on the property. MACTEC has outlined a number of recommendations to address these concerns. The details of the MACTEC Due Diligence may be found in the MACTEC report titled:

Due Diligence Site Investigation Emgold (US) Corporation Former Lausman Property 11352 Bennett Road Grass Valley, California. MACTEC Project No. 4085040502 07, March 31, 2004.

The Phase I Environmental Site Assessment is preliminary in scope and MACTEC recommends more detailed assessment including testing on samples of soil and groundwater.

Virtually all of the building structures related to the historic mine operations on the Idaho-Maryland property have been removed. The only physical structures remaining are two concrete towers. Idaho-Maryland management has stated that the company may be responsible for any environmental liabilities pertaining to the former mine operations.

MACTEC also conducted a Wetlands Assessment on the various Idaho-Maryland properties. In summary MACTEC did not identify any wetlands on the Idaho-Maryland sites. As part of the dewatering program of the project, Idaho-Maryland plans to discharge treated waters into Wolf Creek and the South Fork of Wolf Creek. These discharges would require diffusers to be placed in the creeks. The South Fork of Wolf Creek is considered a Water of the US and is subject US Army Corps of Engineers jurisdiction, therefore it is expected that the Corps would require a National Permit #7 prior to installation of the diffuser.

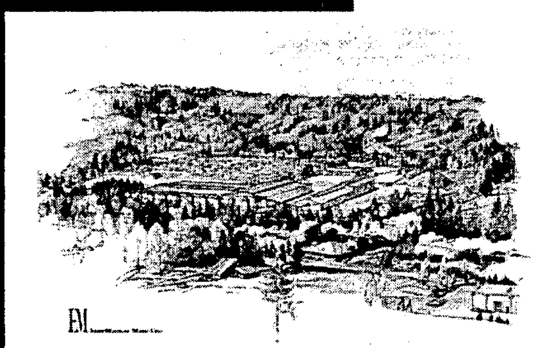
The findings of the Wetlands Assessment may be found in the following report:

Wetland Assessment, Idaho-Maryland Mining Corporation, Nevada County, California. Idaho-Maryland Mine Project, MACTEC Project no. 408504050201A, October 14, 2004.

PRELIMINARY ASSESSMENT TECHNICAL REPORT

Idaho-Maryland Mining Corporation

SECTION 5



Accessibility, Climate and Phisiograpy

5.0 ACCESSIBILITY, CLIMATE, AND PHYSIOGRAPHY

The Idaho-Maryland property is located 1.5 miles from the center of Grass Valley, Nevada County, in north central California. The City of Grass Valley is approximately 50 miles northeast of Sacramento, in north-central California. The property comprises approximately 2,750 acres of mineral lands. Employee and visitor access to the property will be via a short mine road from East Bennett Street, which passes to the south of the project site. Heavy vehicle access will be from Centennial Drive, which passes to the east of the Idaho-Maryland property. State Highway 20/49 passes approximately 1 mile to the west and northwest of the property.

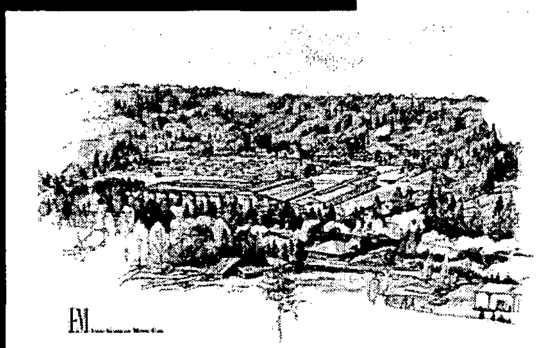
The Idaho-Maryland property is at an elevation of approximately 2,650 ft amsl. The area is in the foothills of the Sierra Nevada range and the project site exhibits moderate topographic relief.

The project site is mostly wooded with some open grassy areas. The North Fork of Wolf Creek flows from east to west along the northern boundary of the property.

January average daytime and night-time temperatures are 54 and 32°F respectively, and the July average daytime and night-time temperatures are 90°F and 57°F respectively. Annual precipitation averages 52.7" with most of the rainfall occurring between November and March.

Idaho-Maryland Mining Corporation

SECTION 6



History

6.0 HISTORY

Gold was discovered on the Idaho-Maryland property in 1862. Mining started in 1862, and gold production continued with few interruptions until closure in 1954. From 1954 to 1957, gold mining was replaced by government-subsidized tungsten production. The mine produced a total of 2,383,000 oz of gold from 5,546,000 tons of ore for an average grade of 0.43 oz/ton. Idaho-Maryland remains the second-largest historical underground producer of gold in California.

Two mills were operated on the property in the 1930s through 1950s, the Idaho mill and the New Brunswick mill. Both incorporated crushing, grinding, gravity separation, sulfide flotation, and gold smelting/refining. The Idaho mill also had a cyanidation plant and Merrill-Crowe recovery circuit to treat flotation concentrates and flotation tails sands. Flotation concentrate from the New Brunswick mill was also processed in the Idaho cyanidation circuit.

Historical production records from the 1930s and 1940s indicate overall gold recoveries ranging from 93.8% to 97.2% using gravity recovery, flotation of gravity tails, and cyanidation of flotation concentrate and flotation tails sands. Of the total gold produced during this period, recovery in the gravity circuit ranged from 61% to 69%. In the flotation circuit, recoveries ranged from 30% to 37%. Approximately 1.3% of the total gold recovered was via sands cyanidation. Gravity recovery methods used at the time included riffles, amalgamation plates and barrels, shaking tables, vanners, and jigs.

The Idaho-Maryland mine has been developed and mined progressively over a period from 1851 to 1956 and has been accessed by multiple shafts and winzes. The main shafts from surface were the Idaho, Old Brunswick, New Brunswick, and Round Hole, with two being intact vertical shafts, but flooded.

In 1991, the three-compartment, 3,460 ft deep New Brunswick vertical shaft was inspected throughout its entire length by remote underwater cameras and probes. The timbers, appeared to be in reasonable condition, except for the sections above the waterline. This shaft provided access to the Idaho-Maryland's 34 working levels. Most access drifts were 5 ft x 7 ft in cross-section, while the main haulage drifts were 6 ft x 8 ft. Hoisting is reported to have been accomplished with 6-ton skips.

The Round Hole shaft is a vertical, 5 ft diameter circular shaft, core-drilled to a vertical depth of 1,125 ft. This shaft was used for ventilation and to transport men and mine supplies, and is thought to still be open.

The "million ounce" stope in the Idaho No. 1 Vein was mined between 1862 and 1893 and reportedly required heavy timbering for support due to problematic ground conditions. Production in this area of the mine was terminated after a hoist fire destroyed the Idaho headframe. Much better ground conditions were experienced at the Brunswick mine, where the primary mining method was shrinkage stoping. At Brunswick, the stopes were developed by drifting on ore for their entire length, and then draw raises were developed upwards for approximately 20 ft and coned out to connect them together. Chutes were installed in the throat of the raises to load ore directly into the mine cars. Where ground support was required within the stopes, small pillars either were left in place or strategically placed timber posts were used. Flat-lying stopes were mined using the room-and-pillar method, and scraper hoists were used to transport ore to the track drift horizon.

Hydraulic tailings backfill was used in the later years of mine life, although references to the same type of backfill date back to 1947 in company reports. According to an ex-employee who worked at the mine for many years prior to closure, the backfill was used to fill various open stopes so that overlying ore could be accessed and mined. Stope productivity was reported to be low, on the order of 3 tons to 4 tons per shift.

Mining activities were curtailed in 1956 as labor costs were rising and the price of gold was fixed at $35/oz.

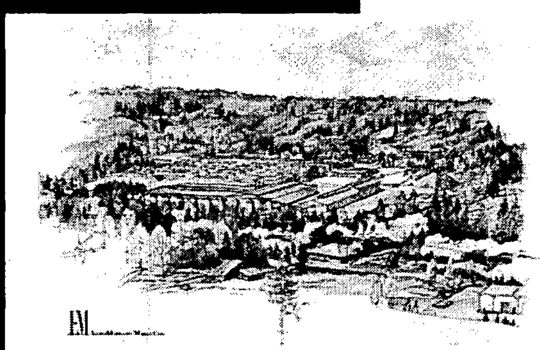
More recent exploration at the Idaho-Maryland project conducted over the period of 1993 through to 2004 has consisted of an extensive geologic evaluation program and core drilling. This geologic data evaluation program was possible because of the excellent and comprehensive preservation of the Idaho-Maryland mine and mill records. These data are exhaustive and essentially complete, and were used to generate a consistent, property-wide structural geology model and vein set definition and chronology.

The available key historic data consisted of:

- 3,200 mine maps and drawings, including 1,257 linen maps (1" = 50 ft assay plans, geology plans and stope plans, 1" = 100 ft geologic cross-sections), with exploration drill hole geology and assays plotted on them
- 1,100 photographs (surface and underground)
- monthly development reports for 1921 to 1956
- monthly geological summary reports for 1936 to 1942
- eight ledgers of development and stope sampling assays
- assay reports of diamond drilling, channel samples, and muck car samples
- general manager's and mine superintendent's reports for 1947 to 1953
- mill production reports and cost summaries for 1934 to 1956.

PRELIMINARY ASSESSMENT TECHNICAL REPORT

Idaho-Maryland Mining Corporation



SECTION 7

Geological Setting

7.0 GEOLOGICAL SETTING

7.1 Regional Geology

The Idaho-Maryland Mine and the Grass Valley Mining District are situated in the northern portion of the Sierra Nevada Foothills Gold Belt. This belt averages 50 miles in width, and extends for 320 miles in a north-northwest orientation along the western slope of the Sierra Nevada range (see Figure 7-1). The extent of the Sierra Nevada Foothills Gold Belt coincides closely with the outcrop area of the Sierra Nevada Foothills Metamorphic Belt.

The Sierra Nevada Foothills Metamorphic Belt comprises a complex collage of lithologic units formed as a result of northward lithospheric plate subduction and transpression at a collisional plate boundary during the late Jurassic to early Cretaceous Nevadan Orogeny (see Figure 7-2). The basement rocks of the belt are submarine meta-volcanics, meta-sediments, and oceanic crustal rocks of Ordovician to Jurassic age. The north-northwest structural grain is defined by a series of sub-parallel, right-lateral wrench faults that represent deep-seated suture zones. These structural breaks separate individual accreted terranes. Discontinuous belts of alpine-type ultramafic intrusions (serpentinites), and serpentinite-matrix tectonic mélange, both mark the trace of the deep-seated structural breaks that border individual lithotectonic terranes. Subduction-related, late Jurassic to Cretaceous composite batholiths and plutons of dominantly granodioritic composition subsequently intruded the collage of basement rocks.

The basement rocks of the Sierra Nevada Foothills Metamorphic Belt are divisible into three discrete north-northwest-trending belts separated by first-order, right-lateral wrench faults of great linear extent. Mesothermal lode gold mineralization occurs in all three belts, but the belt that yielded the majority of gold production was the Central Metamorphic Belt. The Grass Valley Mining District lies within this principal belt.

Individual accreted terranes within the Central Metamorphic Belt are of diverse origin and composition. The terranes are comprised of thick Triassic to Jurassic submarine meta-volcanic and meta-sedimentary accumulations deposited on oceanic crust. Individual accreted terranes situated in the western half of the Central Metamorphic Belt include Jurassic volcanic-plutonic arc sequences (Lake Combie Complex, Slate Creek Complex), late Triassic to early Jurassic accretionary prism (Fiddle Creek Complex), and Jurassic serpentinite-matrix tectonic mélange containing large fragments of all the above-mentioned units (Sierra Foothills Mélange). The tectonic mélange units developed along deep-seated crustal breaks bounding the relatively intact terranes (Duffield and Sharp 1975). The volcanic-plutonic arc sequences were deposited atop early Jurassic oceanic crust (ophiolite) in a supra-subduction zone fore arc basin setting. The accretionary prism and

Figure 7-1: Regional Geology

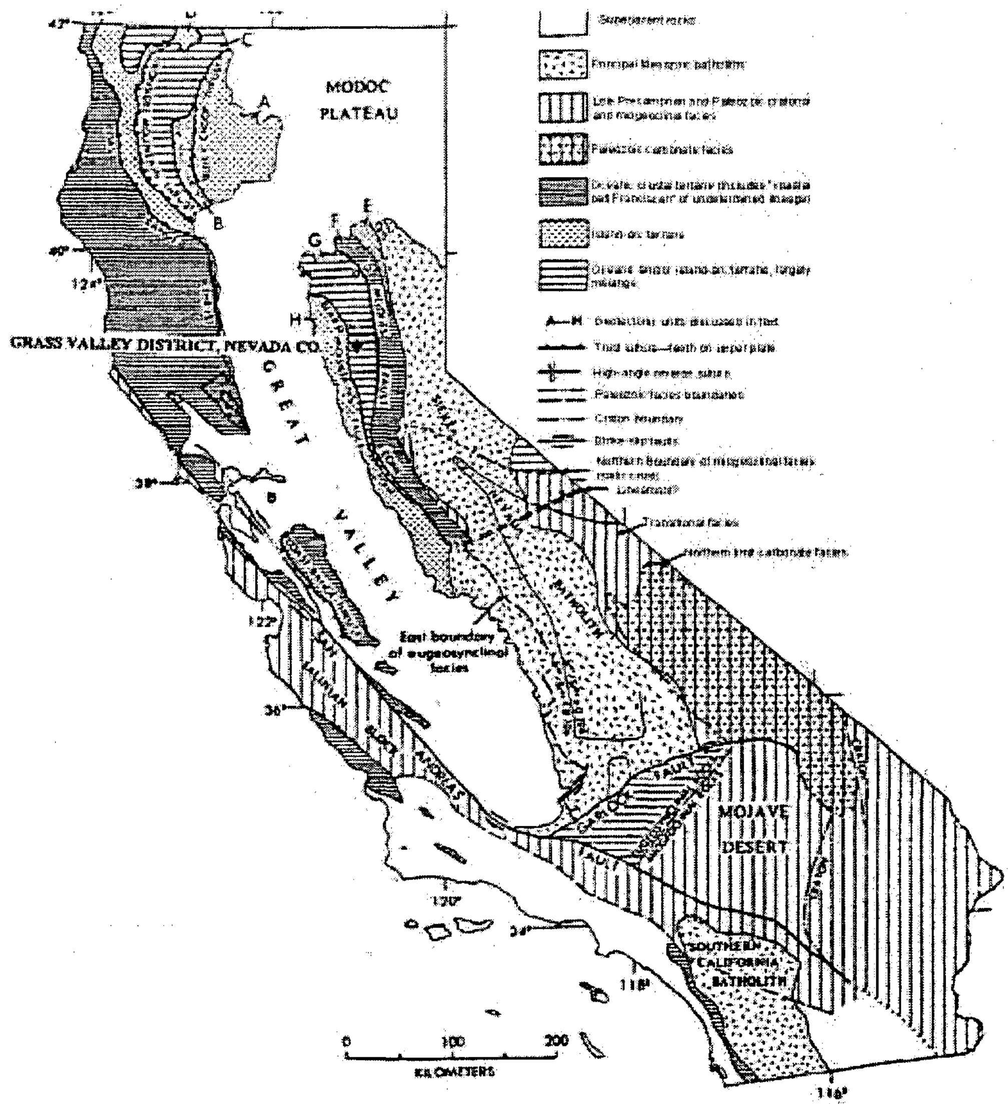
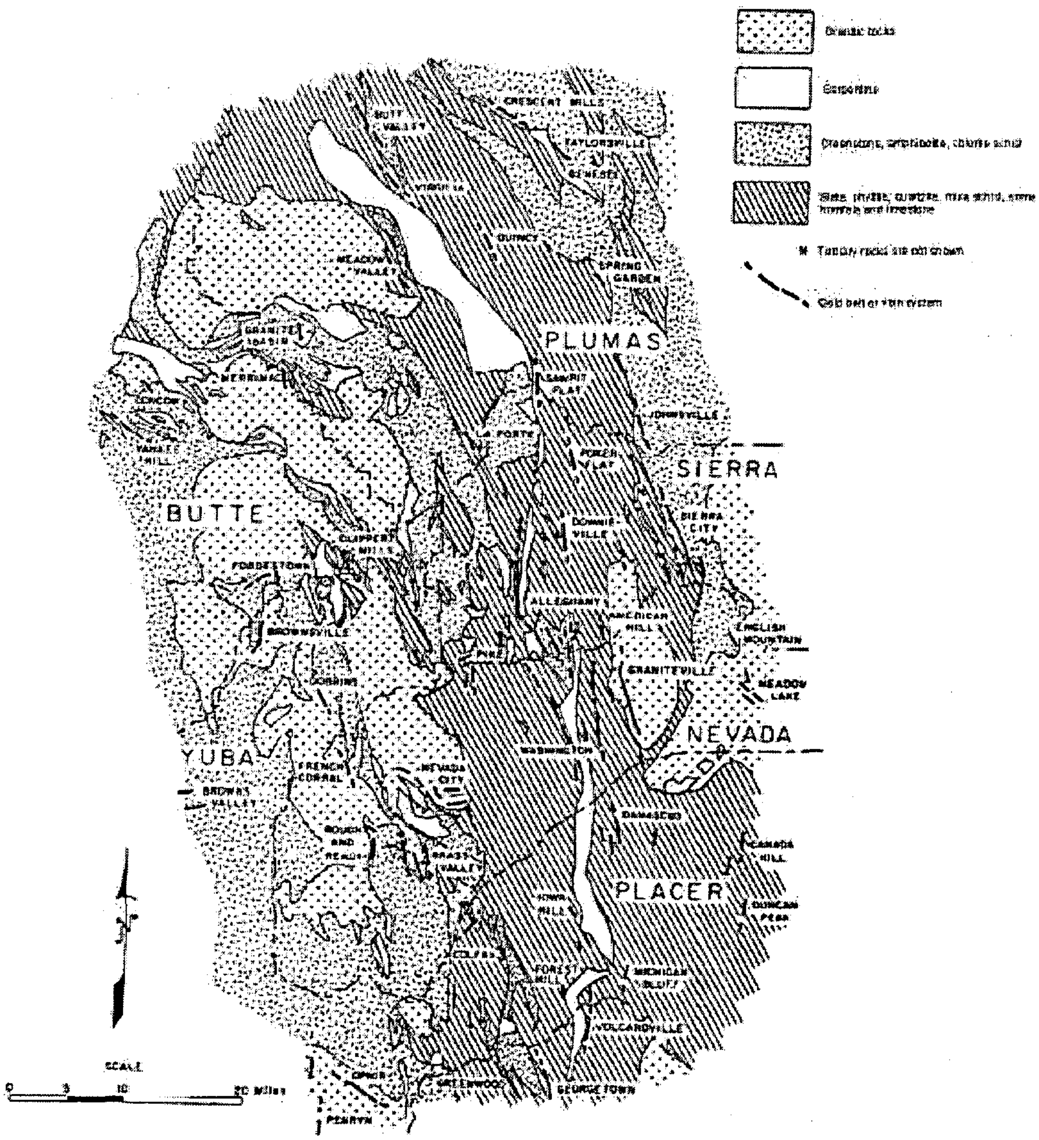


Figure 7-2: Regional Lithologic Units



sediment-matrix mélange was deposited atop older oceanic crust (ophiolite) of upper Paleozoic age bordering the early Jurassic fore arc basin (Day, 1997; Ash, 2001). The individual terranes vary both in their degree of deformation and metamorphic grade. The regional metamorphic grade of individual terranes ranges from lower greenschist facies to high-pressure blueschist facies.

The Grass Valley Mining District occurs in the western half of the Central Metamorphic Belt where it consists of an 8-mile wide north-trending assemblage bound on its west and east sides by regional-scale tectonic suture zones. The Wolf Creek Fault Zone, which bounds the western side of the Central Metamorphic Belt, ranges from 500 ft to 2,000 ft wide in the Grass Valley area and encloses tectonic mélange slabs of meta-sedimentary rock. The Gillis Hill Fault/Melones Fault bounds the eastern side of the Central Belt in the district and can be traced for over 100 miles southward, where it hosts the Mother Lode Gold Belt.

Preliminary studies have demonstrated that the gold mineralizing event defining the Sierra Nevada Foothills Gold Belt appears to post-date peak regional metamorphism and pre-date intrusion of the Sierra Nevada batholith. The gold deposits of the Sierra Nevada Foothills Gold Belt are found in linear belts conspicuously associated with the network of deep-seated structures bounding and/or dissecting lithotectonic terranes within the Central Metamorphic Belt.

7.1.1 Structural Setting

The Sierra Nevada Foothills Metamorphic Belt has a strong north-westerly-oriented structural grain. During the Jurassic Nevadan Orogeny, compression and horizontal shortening was directed east-northeast, imparting a strong structural grain to the region. The Nevadan Orogeny was a result of alternating periods of east-northeast lithospheric subduction of the Kula plate, and right-lateral, transcurrent-compressional strike-slip motion along transform faults in the North American plate. The unique geology along the western coast of North America is thought to be a product of this unusual oblique subduction (Schweickert, 1981). There is evidence to indicate the subduction zone locked up periodically, and transpressional fault movement along a great number of deep-seated faults was the strain-releasing mechanism between the two colliding lithospheric plates. It is this system of deep-seated faults that has localized the gold deposits of the Sierra Nevada Foothills.

A minimum of three deformation episodes are recognized in the mining districts of the Sierra Nevada Foothills. The first is related to the alternating oblique subduction and transpressional faulting during the Nevadan Orogeny that generated north-northwest-oriented isoclinal folding in the zones of high strain, and open-type folds in the areas of lower strain. The folds plunge at shallow angles northerly and southerly. This is not considered to be a result of subsequent cross-folding, but to have occurred concurrently with the north-northwest-oriented folding event coincident with regional-scale boudinage structures (Payne, 2000; Tuminas, 1983). In the high-strain zones, a pervasive northwest-oriented axial planar cleavage was developed during that event. The second episode of deformation is related to the forceful intrusion of late syn-orogenic granodiorite to diorite plutons, which pre-date the emplacement of the Andean-type Sierra Nevada Batholith (Ash, 2001). The final episode is related to the gold mineralization events of the Sierra Nevada Foothills Gold Belt, approximately 5 to 10 million years after the syn-orogenic intrusion event, depending on location (Ash, 2001; Day, 1997; Bohlke and Kistler, 1986).

The most productive gold districts in the Sierra Nevada Foothills Gold Belt are associated with regional-scale boudinage neck features in conjunction with deep-seated crustal breaks. In the Grass Valley region, the western half of the Central Metamorphic Belt has necked-down to an 8 mile width from its typical 12 mile width. Similarly, many of the productive nodes along the 100 mile length of the Mother Lode Gold Belt are coincident with similar structural situations (Payne, 2004, pers. comm.; Payne, 2000).

The gold deposits in the Sierra Nevada Foothills are concentrated along numerous north to northwest-trending corridors of high strain related to second-order fault structures. The second-order faults branch from the first-order regional breaks that border the individual accreted terranes. Dilational jogs and pronounced bends in first-order fault zones can be points where favorable second-order branch faults develop. Favorable second-order faults can also occur where rock competency contrasts develop pressure shadows adjacent to first-order faults. Many important gold deposits are located in third- and fourth-order faults, with poor mineralization occurring in the second-order structures. Dilational jogs, bends, and pressure shadows in or adjacent to second-order faults can localize mineralization within favorable third- and fourth-order faults. At all scales, the corridors of high strain demonstrate a braided character, with high-strain zones encompassing lensoid or rhomboid domains of lesser strain.

7.2 Property Geology

The rocks underlying the Idaho-Maryland Mine property are divisible into four separate units, ranging in age from early to middle Jurassic:

1. Early Jurassic metasediments of the Fiddle Creek Complex, situated east of the Weimar Fault, in the lower plate of the Clipper Creek Thrust.
2. Early Jurassic volcanic-plutonic arc sequence and ophiolitic basement rocks of the Lake Combie Complex situated east of the Weimar Fault, in the upper plate of the Clipper Creek Thrust.
3. Middle Jurassic Spring Hill Tectonic Mélange, which contains heterolithic chaotic slabs correlative with the ophiolitic basement and volcanic-plutonic rocks of the Lower

Volcanic Unit of the Lake Combie Complex, incorporated into a sheared serpentinite-matrix derived from probable upper mantle harzburgite tectonite (Payne, 2000).

4. Middle Jurassic tectonic mélange of the Weimar Fault Zone.

7.2.1 Fiddle Creek Complex

The portion of the Fiddle Creek Complex underlying the project area is an early Jurassic accretionary sedimentary prism related to a submarine subduction complex. It is a highly disrupted sedimentary and volcanic sequence that exhibits a higher degree of metamorphism than adjacent units. The Fiddle Creek Complex outcrops east of the Weimar Fault Zone, exposed as isolated windows of limited size in the lower plate of the Clipper Creek Thrust (Tuminas, 1983; Edelman et al, 1989; Loyd et al, 1990; Saucedo et al, 1992; and Payne, 2000). The isolated outcrops of this sequence on the Idaho-Maryland property are tentatively correlated with the early Jurassic Clipper Gap Formation, the uppermost unit of the Fiddle Creek Complex (Tuminas, 1983). This unit is poorly studied and its age is uncertain.

Outcropping windows of Clipper Gap Formation immediately east of the Weimar Fault Zone are a highly disrupted assemblage of interbedded chert and argillite. The unit exhibits poorly developed stratification that has been tilted to near-vertical attitudes (Lindgren, 1896, p.79). Locally, the chert-argillite sequence is interpreted to have been tectonically intermixed within a slate matrix to form a sediment-matrix tectonic mélange in a subduction complex (Tuminas, 1983). Portions of the chert-argillite sequence may have been deposited as well-stratified olistostromes in perched basins atop the chaotically accumulating subduction complex. The Clipper Gap Formation is best exposed underground in the 8 Crosscut on the Brunswick 1100 Level, east of the Weimar Fault. The chert-argillite sequence is folded into a synform striking 300°. Black carbonaceous argillites dominate the sequence with interbedded dark gray chert, and minor beds of calcareous muddy sandstone (Farmin, March 1939b, June 1940b). Hard chert interbedded with sandstone and calcareous mud layers were encountered east of the Weimar Fault in the 13 Crosscut on the Idaho 1000 Level (Farmin, July 1937a).

7.2.2 Lake Combie Complex

The early Jurassic Lake Combie Complex is a fault-bounded tectonostratigraphic unit more than 40,000 ft thick, representing intact fore arc basin oceanic crust (ophiolite) and overlying volcanic-plutonic arc sequence (Tuminas, 1983). The structurally lowest unit in the Lake Combie Complex is the serpentinized ultramafic basement, cumulate gabbro-diorite, and diabasic-sheeted dike complex comprising the oceanic crustal basement (ophiolite). The overlying volcanic-plutonic arc sequence is comprised of three map units (lower, middle, and upper). All of the volcanic units are intricately intruded by hypabyssal and plutonic rocks of gabbroic, dioritic and diabasic composition that represent 20% to 50% of the volcanic section by volume. The Lake Combie Complex is presently found in the upper plate of the Clipper Creek Thrust as nappes. The Weimar Fault divides the nappe into two structural blocks. The Chicago Park Nappe is exposed on the east side of the Weimar Fault, the Lake Combie Nappe on the west. An intact portion of the Chicago Park Nappe, representing a portion of the Lower Volcanic Unit of the Lake Combie Complex, underlies the property east of the Weimar Fault.

The Lower Volcanic Unit (LVU) is comprised predominantly of andesitic to basaltic flows and flow breccia units intruded by discordant diabase, diorite, and gabbro bodies (Tuminas, 1983). The discordant plutonic rocks increase in abundance toward the bottom contact of the LVU. Lesser units (less than 15% of the LVU) include pyroclastic breccia deposits and interbedded tuff and interflow sedimentary layers. The ceramics feedstock resource resides in flow and intrusive members correlative with this unit.

7.2.3 Spring Hill Tectonic Mélange

The middle Jurassic Spring Hill Melange comprises a chaotic assemblage of clasts dismembered from the early Jurassic Lake Combie Complex, which are enclosed in a sheared serpentinite matrix. The Spring Hill Melange was recently identified as a mappable lithotectonic unit in 1995 (Payne et al, 1997). It is a district-scale structure, which underlies a 4 mi^2 area and dominates the property geology. The mélange unit is 4,200 ft wide, extends for 4 miles in a 300° orientation, and crosscuts the regional structural grain. The mélange is localized within an apparent district-scale boudinage neck (Payne, 2000). The mélange is defined by the Grass Valley Fault at its southern margin and the Olympia Fault on the north (Loyd and Clinkenbeard, 1990). All of the significant gold production from the Idaho-Maryland Mine was localized entirely within the matrix and tectonic slabs at the eastern end of this unit.

The Spring Hill Mélange consists of a sheared, well-foliated, highly deformed serpentinite matrix enclosing a chaotic arrangement of tectonic clasts. The serpentinite matrix is considered to be serpentinized upper mantle harzburgite tectonite which has subsequently undergone retrograde metamorphic re-equilibration to yield a rock composed predominantly of lizardite, the low-temperature serpentinite mineral (J. Post, 2004, personal comm.). No pre-serpentinization igneous textures are preserved in the matrix material. In outcrop, hard clasts with rounded to rod-shaped morphology have an appearance and arrangement similar to augen within a schist. The tectonic clasts or fragments incorporated into the mélange range from fist-sized clasts to mega-clasts up to 1.5 x 0.6 miles in dimension. The mega-clasts will be referred to as "tectonic slabs" when discussed in this report.

The ***Brunswick Slab*** is the largest and economically most important of the tectonic slabs. It borders the southern side of the Idaho-Maryland mine workings, extending eastward for 1.5 miles, and encompasses the Brunswick and Union Hill mine workings. The Brunswick Slab is a fault-bounded fragment correlative with a portion of the Lower Volcanic Unit of the Lake Combie Complex. It includes a thick stratigraphic sequence of intermediate to mafic meta-volcanic flows, flow breccias, lesser tuffs, and minor interflow sedimentary units, all cut by a discordant suite of igneous plutonic to hypabyssal rocks representing feeders for volcanics higher in the sequence (not represented in the slab). The western 25% of the Brunswick Slab is nearly all discordant plutonic intrusives with only minor wedges of the volcanic stratigraphy remaining. The interflow meta-sedimentary units include red to green cherts, black carbonaceous slates to wackes, and rare marl beds. The contacts of the slab dip toward the center, indicating diminishing size with depth. The Brunswick Slab hosts the Brunswick and Dorsey Vein Sets and provides important controls for the Idaho and Morehouse Vein Sets. The ceramics feedstock resource resides entirely within the Brunswick Slab.

The ***Maryland Slab*** is a fault-bounded cumulate gabbro fragment of ophiolitic affinity. The slab is elongated in a west-northwest orientation and outcrops in the Round Hole shaft area, directly north of the Brunswick Slab, within the Idaho Deformation Corridor. The Maryland Slab measures approximately 3,200 ft in a WNW-orientation, 750 ft north-south; the Round Hole Shaft was collared in the slab but broke out of it into serpentinite mélange matrix at 180 ft vertical depth (Newsom et al, 1956). The Maryland Vein Set is localized well beneath the keel of this shallowly southeast-plunging slab.

The ***Fulton Slab*** is a large fragment preserving interbedded sediments and volcanics, possibly correlative with the Middle Volcanic Unit of the Lake Combie Complex. The Fulton Slab shows promise that it may be a large and important ore control below the present depth of development in the mine. The slab does not outcrop and is located 200 ft WNW beyond the western terminus (keel) of the Brunswick Slab, lying parallel to, and beneath it. The slab was accidentally discovered in 1923 when the Idaho No.1 Shaft was sunk into its northeast contact. A horizontal core hole drilled in 1933 penetrated a 650 ft thick sequence of carbonaceous black slate to wacke with interbeds of black to gray fragmental volcanics. Also in 1933, a crosscut was driven from the Idaho No.1 Shaft on the 1500 Level, which extended to reach the north contact of the Fulton Slab. Unlike the adjacent Brunswick Slab, the Fulton Slab contacts diverge away from one another, indicating this is the top of a much larger slab extending to depth. The Fulton and Morehouse Vein Sets are localized in, or adjacent to, the Fulton Slab.

The ***Sealy Slab*** is a relatively small monolithologic clast of sheeted diabasic dike complex located within the Idaho Deformation Corridor. It is worthy of mention due to its excellent outcrop exposure in a cut bank. It is the type area for the Spring Hill Mélange unit. Evidence of its ophiolitic affinity and faulted contact with the sheared serpentinite mélange matrix are nicely exposed. The Sealy Slab is located 300 ft southward from the East Eureka shaft collar.

The ***Alpha Slab*** is a rounder, boulder-like slab, which outcrops within the Idaho Deformation Corridor approximately 300 ft east of the old Maryland Shaft. The Alpha Slab is a strongly pyritic dacite tuff breccia containing angular to subangular volcanic bomb-sized fragments of leucocratic diorite and gabbro. The Alpha Slab measures 52 ft across in an East-West orientation and is accompanied by several smaller satellitic slabs of identical composition.

The ***Beechel Slab*** is a large meta-volcanic fragment discovered at the 1200 Level in the Idaho workings while developing the Idaho 2 and 116 Veins. The Idaho 116 Vein lies along the north contact of the slab and the Idaho 122 Vein is hosted along a flow contact within the slab. The Beechel Slab is situated within the Idaho Deformation Corridor, in the hanging wall of the Idaho 2 Vein and G Fault.

The ***Greenhorn Slab*** is composed of diabase and was discovered by a fan of core holes drilled northward, horizontally from the Brunswick 3300 Level. The Greenhorn Slab hosts gold-quartz vein mineralization at both its north and south contacts. The important L Fault lies along the north contact of the slab. The extent of this slab and associated gold mineralization are unknown.

7.2.4 Tectonic Mélange – Weimar Fault Zone

Highly deformed serpentinite occurs discontinuously along the 40-mile trace of the Weimar Fault Zone. The serpentinite fault matrix hosts numerous exotic slabs, with the largest one named the Green Slab. The Green Slab is a large basaltic to andesitic volcanic slab intersected in the 11 Crosscut on the Brunswick 1300 Level. It is 330 ft wide and hosts a high-grade oreshoot in the Washington 2 Vein. The slab is situated due east from the New Brunswick vertical shaft and does not outcrop at the surface.

7.2.5 Dioritic Intrusions

Minor dioritic intrusions are scattered across the Idaho-Maryland property, many of which are too small to map. The largest dioritic intrusion is a 1,300 x 900 ft mass underlying an isolated, ellipsoid-shaped hill in the far northern tip of the property, adjacent to the west of Brunswick Road. It intrudes the far northeastern portion of the Spring Hill Mélange unit. Another small, dark gray dioritic dike outcrops at Idaho-Maryland Road and extends southward onto the eastern edge of the Morehouse patented claim. It is fresh, unaltered, and undeformed. This dike is 13 ft thick and contains abundant anhedral accessory pyrite.

7.3 Property Structural Geology

Regional-scale structures that provide important controls for mineralization on the property or provide important structural geologic context for mine-scale structures on the property include:

- the apparent boudinage neck structure in the western half of the Central Metamorphic Belt
- the paired Lake of the Pines Synform and Greenhorn Antiform, developed west of and east of the Weimar Fault, respectively
- the Lake Combie and Chicago Park Nappes, developed west of and east of the Weimar Fault, respectively.

The shape of the Idaho-Maryland gold ore deposit is controlled by the regional-scale Weimar Fault and the district-scale Spring Hill Tectonic Melange Zone. The tectonic mélange units of both major structural elements were discussed previously in the stratigraphy portion of this report. The Weimar Fault is a NNW-trending right-lateral wrench fault that transects an accreted terrane along its 50-mile course. The fault cuts the late Paleozoic to Triassic Fiddle Creek Complex and an overlying nappe of Jurassic Lake Combie Complex rocks. It is a second-order fault that is of a younger age than the first-order suture zones, which bound the accreted terranes. The Weimar Fault is considered to be the source conduit for the gold-bearing fluids for the Idaho-Maryland deposit.

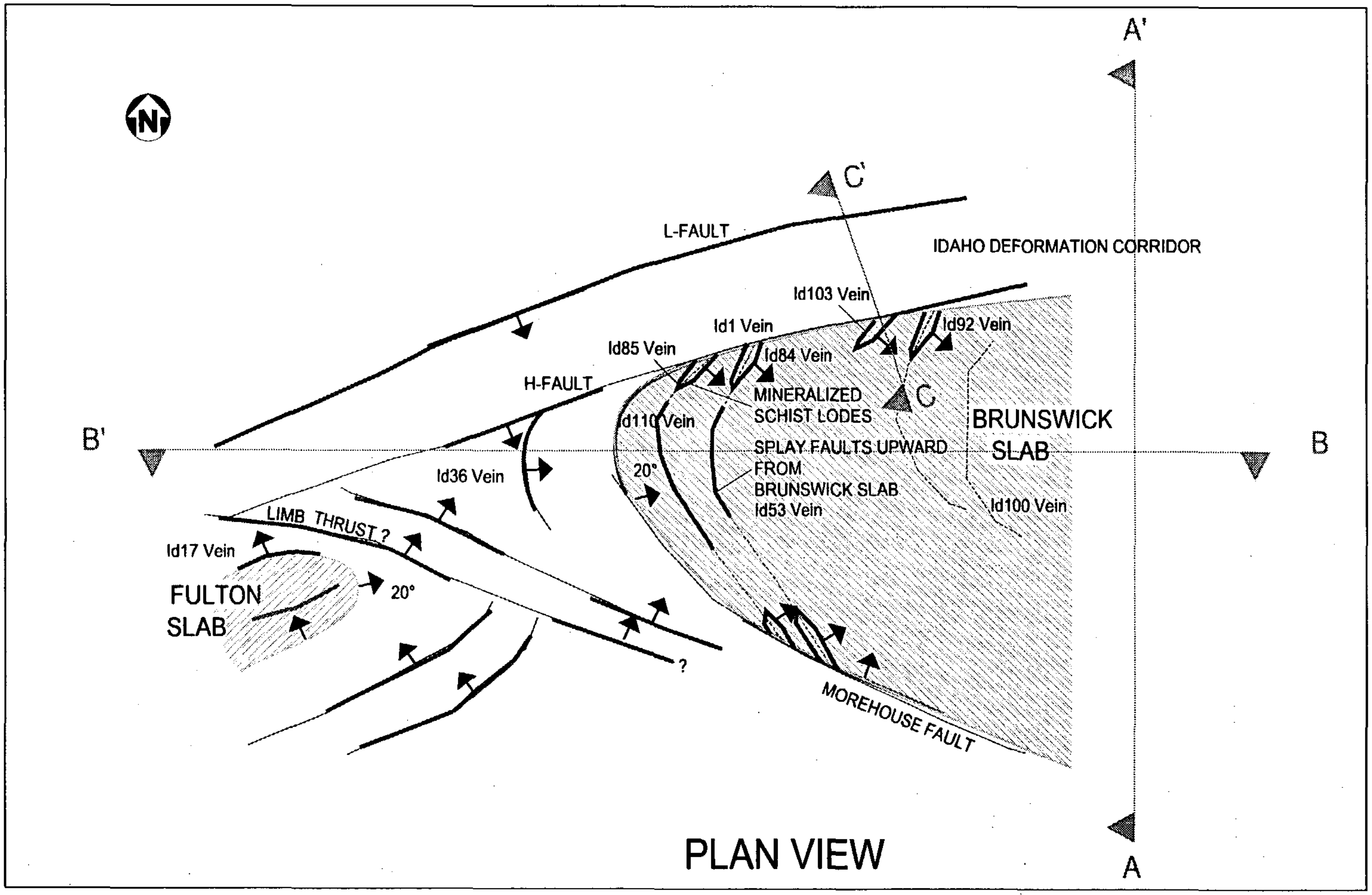
7.3.1 Weimar Fault Zone (6-3 Fault)

The Weimar Fault truncates all structures of the Idaho-Maryland Mine and forms the blunt eastern termination of the wedge-shaped gold deposit. The fault likewise truncates the eastern end of the Spring Hill Mélange unit. The Weimar Fault strikes 330° to 350°, dipping 70° NE through the eastern side of the property. It is poorly exposed due to the gouge and highly comminuted nature of the rocks within the fault zone. The surface trace of the Weimar Fault, near the Brunswick Shaft, was a serpentinite gouge with the consistency of modeling clay, according to Jack Clark, Mine Superintendent from 1954-56 (pers. comm., 1994). Clark further stated that the Weimar Fault intersected the New Brunswick vertical shaft just above the 580 Level station. Underground, the Weimar Fault was intersected in many crosscuts and core holes. In all cases, the fault zone displayed strong shearing and gouge development. The Weimar Fault has not been noted to host economic gold mineralization anywhere within the district. In the underground workings, drifting along the fault exposed small quantities of highly-sheared, crushed, dismembered quartz lenses containing trace to 0.10 oz/ton gold. Within the Grass Valley district, gold deposits are arrayed adjacent to the Weimar Fault along its length.

7.3.2 Spring Hill Mélange

The Spring Hill Mélange unit (see Figure 7-3) is a dominant structural feature at the Idaho-Maryland Mine. A large portion of the mineral rights area is underlain by this unit. In the geological context of the Grass Valley Mining District, the Spring Hill Mélange and the Idaho-Maryland ore deposit cut the structural grain of the district at an obtuse angle. The Spring Hill Mélange unit is elongated in a 300° direction, extending for 4 miles, with an average width of 0.87 miles. It has a pervasive fabric plunging 30° SE at all scales. It is confined on its southern and northern boundaries by the Grass Valley and Olympia Faults, respectively. The matrix of the mélange is sheared serpentinite enclosing large exotic slabs correlative with Lake Combie Complex meta-volcanics and various components of its underlying oceanic crust. The internal structural elements within the mélange control the locations of mineralization in the mine. Individual tectonic slabs have shown important controls localizing individual vein sets and the Idaho Deformation Corridor. The eastern end of the Spring Hill Mélange is notably-slab-rich, whereas the western portion of the mélange is a serpentinite matrix nearly devoid of exotic slabs.

Figure 7-3: Property Structural Geology – Plan View



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7.3.3 Idaho Deformation Corridor

The Idaho Deformation Corridor (Figures 7-3, to 7-5) is a braided zone of high strain that extends along the entire northern side of the wedge-shaped Idaho-Maryland deposit. The corridor averages 500 ft in width and is traceable for 2.0 miles along a 275° to 290° strike. The zone dips 60° to 70° south and extends to the deepest levels of the mine at 0.62 miles. The Brunswick Slab defines the southern boundary of the high-strain zone for nearly its entire length. The L Fault forms the northern boundary of the corridor. The prominent faults in the corridor exhibit a dominant reverse vertical displacement with a much weaker component of right-lateral horizontal displacement. Post-mineral reactivation of the same faults show 50 ft of normal displacement in some cases. The stretch elongation lineation fabric within the corridor rakes southeastward at shallow to moderate angles.

The Idaho Deformation Corridor is comprised of both linear and non-linear fault members. Both fault members show development of strong deformational fabric, gouges, and host the large, high-grade oreshoots of the mine. The linear faults include, from south to north, the Idaho, Q, F, G, 89, H, K, M, and L Faults. Non-linear link faults include the Idaho 2 Vein, Idaho 4 Vein, Eureka, and Hammill Link Faults. The link faults are sigmoidal and trend northeasterly, dipping 20° to 40° SE. The link faults developed at points of dislocation along the contact of the Brunswick Slab. Large tabular plates of the slab were sheared off and displaced downward along the footwall of the fault bounding the corridor on its south side.

7.3.4 Morehouse Fault

The Morehouse Fault (Figure 7-3) branches from the hanging wall of the Idaho Deformation Corridor and follows the footwall contact of the Brunswick Tectonic Slab in a great arc. Mine development at the keel of the Brunswick Slab on the Idaho 1500, 2000, and 2400 levels has suggested that dislocations may occur in a pattern along the bottom contact (keel) of the slab. This has been interpreted from the outside of the slab (Morehouse Vein Set). Ramp-like dislocations along the contact, with fault structures extending into the slab, may explain the development of isolated groups of veins within the Brunswick Slab in the deeper developments of the mine. Vein set development outside of the slab along its keel may be associated with the same fault structures extending outward into the serpentinites from the dislocation site.

Figure 7-4: Geologic Cross Section – Plane of Section No. 20 E, Looking West, Sections C – C[1]

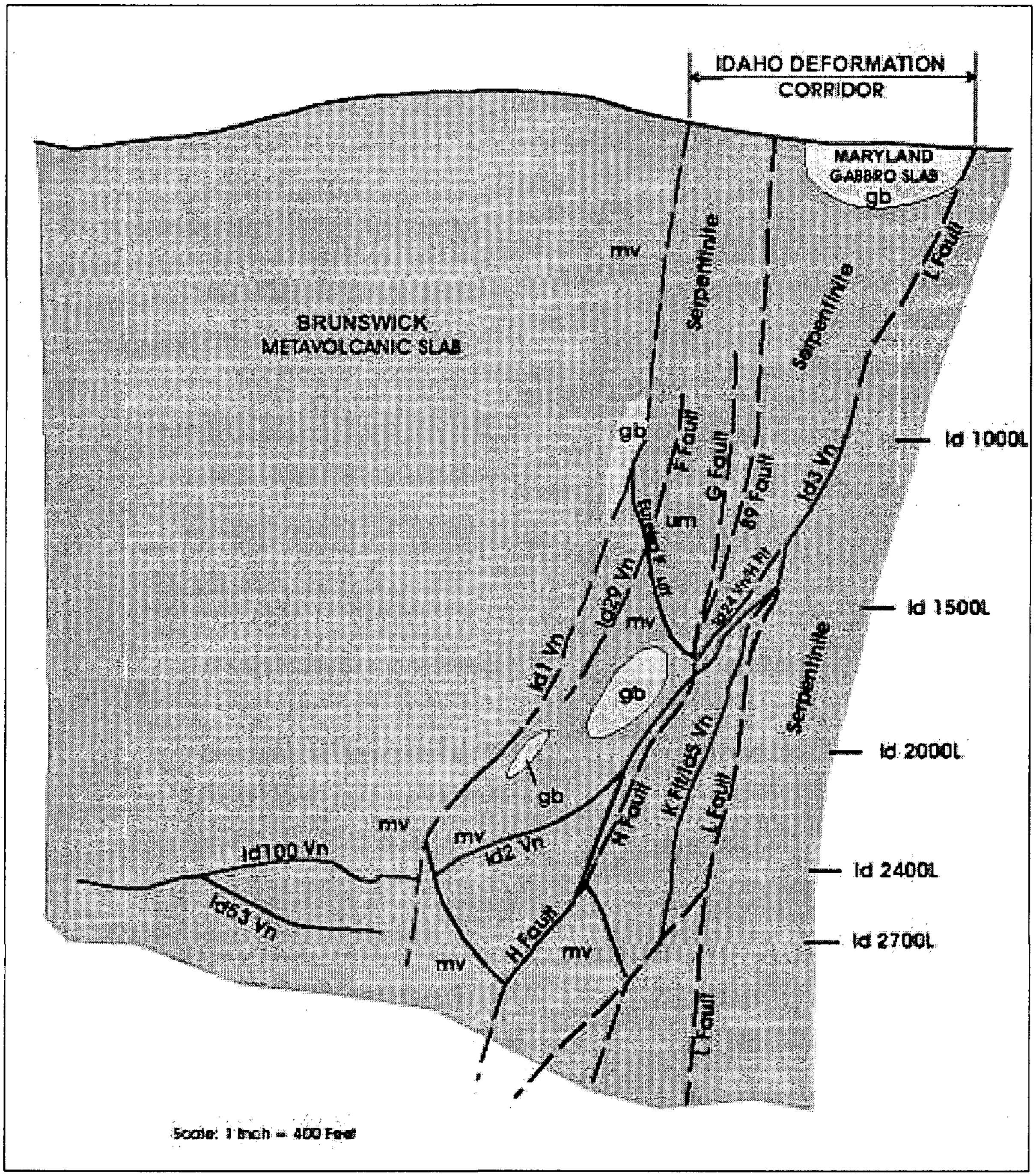
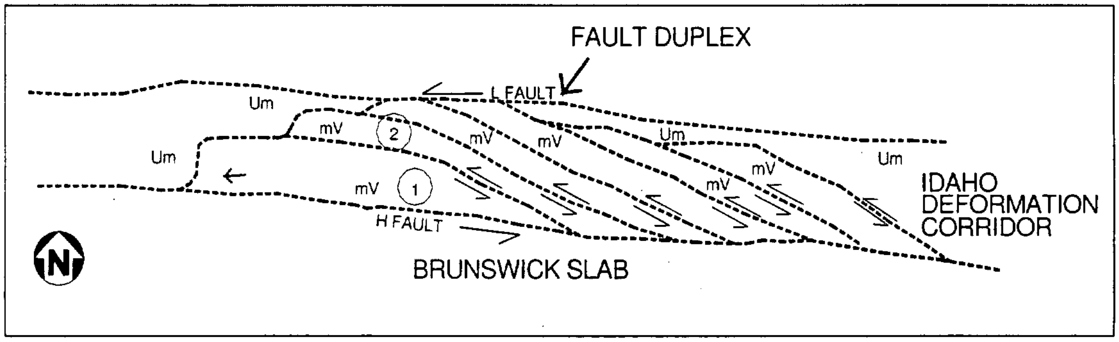


Figure 7-5: Idaho Deformation Corridor



For example, at the Idaho 2000 Level, the Idaho 110 Vein was developed in a 10° SE dipping fault plane within the Brunswick Slab. A new vein structure was encountered in the drift southward along the contact of the slab, localized at a point of dislocation in the slab contact. This new vein matches closely in orientation and attitude with the Idaho 110 Vein. It is worthy of note that the cross cut driven eastward into the slab connecting the Idaho 16 Vein hanging wall with the 110 Vein intersected a large body of mineralized rock. This mineralized body is described as a mass of quartz stringers cutting mineralized diabase. Assays from an interval of mineralized rock with quartz stringers yielded 0.19 oz/ton. The structural conditions at this location are presently unclear, but they imply that gold mineralization may exist in association with the Morehouse Fault.

7.3.5 The Brunswick 20 Series Faults

At the eastern end of the large Brunswick Slab, a series of dislocation planes called the 20 Faults occur. The 20 Faults are sub-parallel to, and found within 1,000 ft of the Weimar Fault. The member faults dip steeply west to near-vertical. The individual faults converge upward into the Weimar Fault. Their course in plan view is 330° to 350° and they are notably sinuous. The 20 Faults cut the volcanic stratigraphy and Brunswick Vein Set at an obtuse angle. Relative displacement of individual Brunswick quartz veins bearing 275° to 290° is approximately 6.6 ft in a right-lateral sense. Members of this family include the 20, 21, 21a, 21b, 22, and 23 Faults.

The 20 series of faults exert locally important controls on oreshoots in the Brunswick Vein Set. The crossing of Brunswick Veins by members of the 20 Fault set can limit oreshoots in some cases. The 20 Faults, in conjunction with a Brunswick vein crossing a bed of interflow graphitic meta-sediments, results in a black slate-type oreshoot of large dimensions. Adjacent Brunswick veins are relatively unaffected in comparison. The 20 Faults locally contain discontinuous low-grade mineralized vein quartz in a similar fashion to that noted in the Weimar Fault.

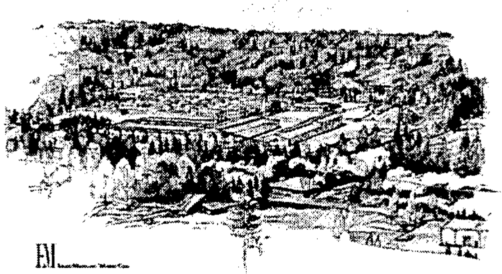
7.3.6 The Brunswick Stacked Faults

At the northeastern corner of the Brunswick Slab is a stacked series of shallowly northeast-dipping fault/veins. They are associated with the junction of the Weimar Fault and the Idaho Deformation Corridor and are most commonly found within 1,000 ft of that wedge area. Well-known members of this vein/fault array are the Brunswick 4, 11, 34, 36, 41, and 48 Veins. Members of this fault set exert important controls on the location of high-grade oreshoots and large stockwork-veined deposits. Both deposit types occur where members or swarms of stacked faults disrupt the steep Brunswick Veins. Oreshoots in Brunswick veins continued upward through an intersection of this type. It is consistently noted that strong gold mineralization proliferated outward from the steep vein into the shallow dipping vein for distances of 50 to 100 ft laterally. Where the arrangement of steep Brunswick veins is close, this can result in large areas of stockwork veining that mimic the shape of the flatter structures. The intersection of the shallow-dipping Brunswick 4 Vein with the steep 7 and 17 Veins resulted in a shallow-dipping stope 200 x 400 ft in an area with a maximum true width of 50 ft. Similarly, the Waterman Resource is situated at the intersection of the Brunswick 4 vein with the steep 10, 31, 35, and 131 veins resulting in a shallow-dipping zone of quartz stock work veins with dimensions of 250 ft along strike, 950 ft along the dip, and an average true thickness of 75 ft.

PRELIMINARY ASSESSMENT TECHNICAL REPORT

Idaho-Maryland Mining Corporation

SECTION 8



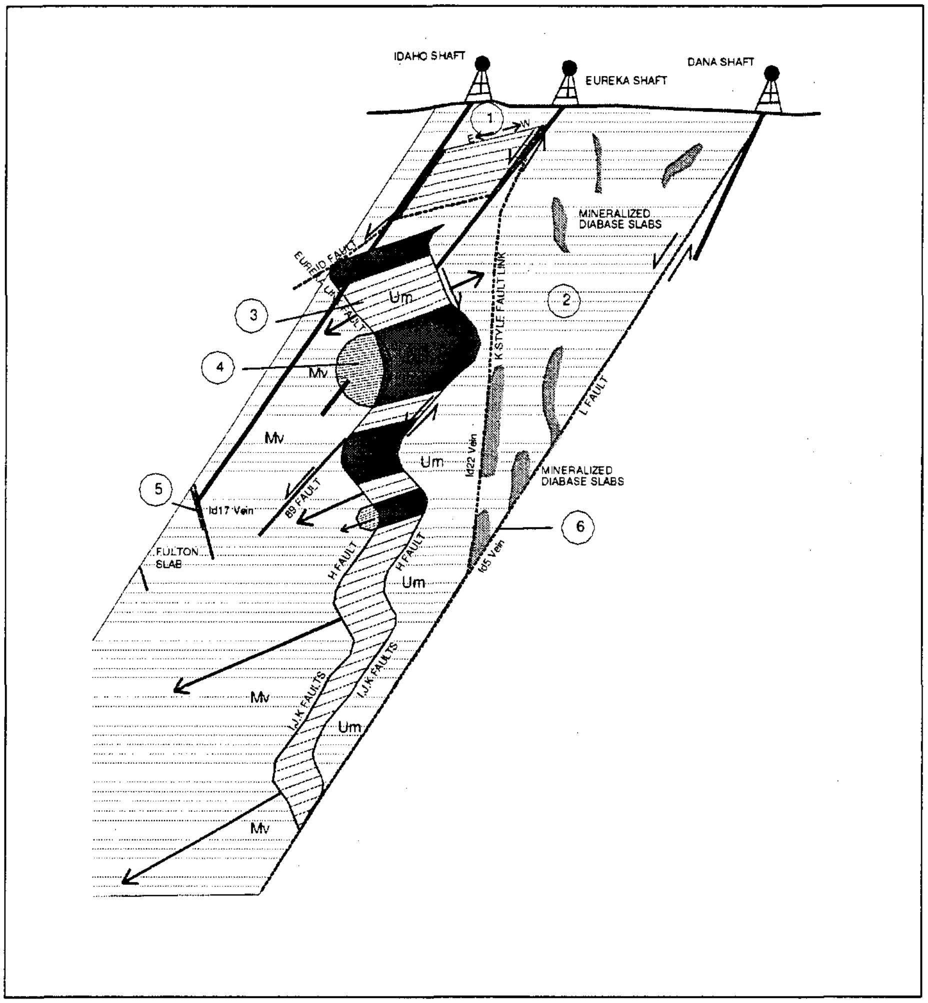
Deposit Types

8.0 DEPOSIT TYPES

This section is only applicable for the gold mineralization and associated gold resource at the Idaho-Maryland Mine.

The Idaho-Maryland Mine is a structurally controlled, mesothermal lode gold deposit for which Emgold has developed a revised, comprehensive deposit model. This model identifies structural features that act as potential hosts to auriferous vein sets and account for the varied deposit types and vein arrays that can occur within any individual vein set. This model is schematically shown in Figure 8-1.

Figure 8-1: Idaho-Maryland Mineralization Types



The development of mineralized vein sets are controlled by four structural features. These are:

- mine-scale boudinage neck features developed within the serpentinite matrix of the Spring Hill Mélange unit
- contact areas of the tectonic slabs within the serpentinite matrix of the Mélange unit
- local flexures and irregularities in the plane of the Weimar Fault Zone can create quartz stockwork zones
- high-grade vein arrays localized in association with bench-like dislocations along the Brunswick Slab contact.

The mineralization is further controlled in veins of a particular vein set by any one of seven structural settings. They are:

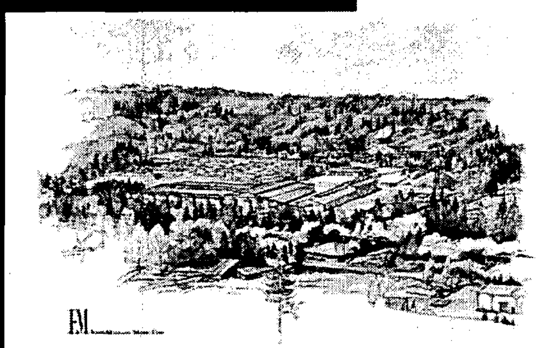
- Rock competency contrast areas: development of an oreshoot along the contact between soft, ductile serpentinite and hard, brittle tectonic slabs at bends along the contact, at dilational jogs, or at offsets/benches in contact associated with incipient attenuation and boudinage
- Wedge-shaped areas between intersecting faults: stacked arrays of shallowly dipping veins can comprise large bulk mineable deposits containing free gold
- Simple concave or convex bends along fault planes
- Vein splits, which are usually manifested at bends along fault planes
- Drag folding of vein structures associated with cross faulting, resulting in vein horsetails and/or mirror-image oreshoots localized in the vein on both sides of a cross fault
- Intersection of steep and shallowly dipping vein members of any vein sets.

Lithology of the vein-hosting units can also be important in localizing mineralization within vein sets. Three lithologic controls are identified:

- Highly graphitic fault planes or partings within interflow sedimentary units. These are found within tectonic slabs composed of intermediate volcanic/volcaniclastic rocks.
- Competent/incompetent rock unit contacts.
- Iron-enriched mafic lithologies. These would include pyritized, chloritized diabasic slabs.

Preliminary Assessment Technical Report

Idaho-Maryland Mining Corporation



SECTION 9

Mineralization

9.0 MINERALIZATION

Mineralization at the Idaho-Maryland Mine comprises two types: the traditional gold mineralization and the industrial mineral feedstock for production of ceramics.

9.1 Gold Mineralization

The veins consist primarily of quartz, which is milky white, massive to banded, sheared, and brecciated. Gold occurs as native gold, ranging from very fine grains within the quartz to leaves or sheets along fractures measurable in feet (Glen Waterman, per.comm. 1996; Jack Clark, per.comm. 1994; Leland Hammill, per.comm. 1995). Other constituents occur in minor to trace amounts and comprise carbonates, sericite, chlorite, mariposite, albite, and scheelite. Sulfide minerals are ubiquitous in the quartz veins (1 to 4 visual percent) and consist primarily of pyrite. In order of abundance, galena, chalcopyrite, and various tellurides are present in trace concentrations. Recent electron microprobe studies of ore specimens collected in the 1940s have identified telluride minerals including hessite, petzite, and coloradoite. Sphalerite and arsenopyrite are rarely observed.

The varying styles of mineralization present at the Idaho-Maryland Project are typical of those commonly found in mesothermal lode gold deposits worldwide. At least four basic types of mineralization have been recognized to contain significant gold deposits. In order of importance, these include (1) gold-quartz veins and vein arrays, (2) mineralized black slate bodies, (3) mineralized diabasic slabs, and (4) altered, mineralized phyllonites. These are discussed in more detail below.

9.1.1 Gold-Quartz Veins

Quartz Veins and Immediate Wallrocks

Quartz veins and their immediate wallrocks (Figures 7-3 and 8-1) have produced over 80% of the gold at the Idaho-Maryland Mine. The gold-bearing quartz veins are structurally complex, strike in all compass directions, and have attitudes that range from horizontal to vertical. The economic veins ranged from 1 to 25 ft in thickness. The largest vein ore shoot was 650 ft in vertical extent and plunged continuously at a shallow angle for 5,600 ft.

The morphology of the veins varied from tabular veins and stringer zones, to oblique-extension veins exhibiting exotic centipede structures. The veins are generally tabular, ribboned to massive quartz, and contain minor gangue and accessory minerals. Vein gangue includes minor carbonate phases along selvages (ankerite, calcite, dolomite, and ferrodolomite), sericite, chlorite, and albite. Pyrite, the dominant accessory mineral, constitutes 1% to 2% of the vein mineralization. The schistose vein wallrock commonly contains gold mineralization up to 10 ft into either or both walls of the vein. The mineralized wallrock is strongly carbonate altered. Accessory pyrite was reported in the wallrocks at similar concentrations to those found in the vein. Gold tenor of the quartz vein deposits ranged from 0.10 to 10.00 oz/ton for individual stopes.

Large Quartz Stockwork Vein Deposits

This type of mineralization consists of a reticulated mass of steep and shallowly dipping quartz veins and veinlets in the Waterman Resource. Vein quartz constitutes 20% to 80% of the mineralized rock by volume. The overall shape of the zone mimics the orientation of the shallowly dipping veins in the set. The dimensions of this body are 250 ft in strike length, 950 ft in dip length, with an average true thickness of 75 ft. The maximum true thickness is 122 ft.

The quartz stockwork veined mineralization shares common characteristics with the other Idaho-Maryland mineralization types. The intermediate meta-volcanic host rocks are bleached and pervasively ankerite + sericite + chlorite + pyrite altered. Coarse particulate free gold was present, but occurred less frequently in stockwork ores compared to all other mineralization types. Gold tenor for stockwork veined material is in the range of 0.10 to 0.20 oz/ton. The stockwork zone has irregular walls caused by the degree of shattering and the intensity of subsequent vein filling. The primary control for stockwork veined bodies was related to bends in the plane of the adjacent Weimar Fault.

Tensional Vein Arrays

Tensional vein arrays localized in wedge areas between intersecting faults have contributed an unknown percentage of the gold production at the mine. Stacked arrays of shallow-dipping quartz veins can constitute large, potentially bulk mineable deposits. Known examples have plan dimensions of 50 x 50 ft to 50 x 220 ft with the down rake projection being the long axis of the deposits. An extreme example is the mineralized wedge at the Id2 and 3 Vein junction, which has been documented on seven mine levels from the Idaho 1600 to 3000 levels, suggesting a rake length of over 3,300 ft. Other examples include mineralized wedges at the following junctions: Id 3 Vein-25 Vein, Id 109 Vein-177, Br9 Vein-10 Vein, Br2 Vein-6 Vein, and Br2 Vein-32 Vein. The ore minerals, gangue minerals, accessory minerals, and alteration types are all similar to those described for the stockwork vein mineralization type, and coarse free gold is also present. Expected gold tenor of mineralized wedge ores is in the range of 0.10 to 0.40 oz/ton. Visual estimation of vein density determines the boundaries. Variations in the plunge inclination have been assumed to control the fracture intensity and economic boundaries.

9.1.2 Mineralized Black Slate Deposits

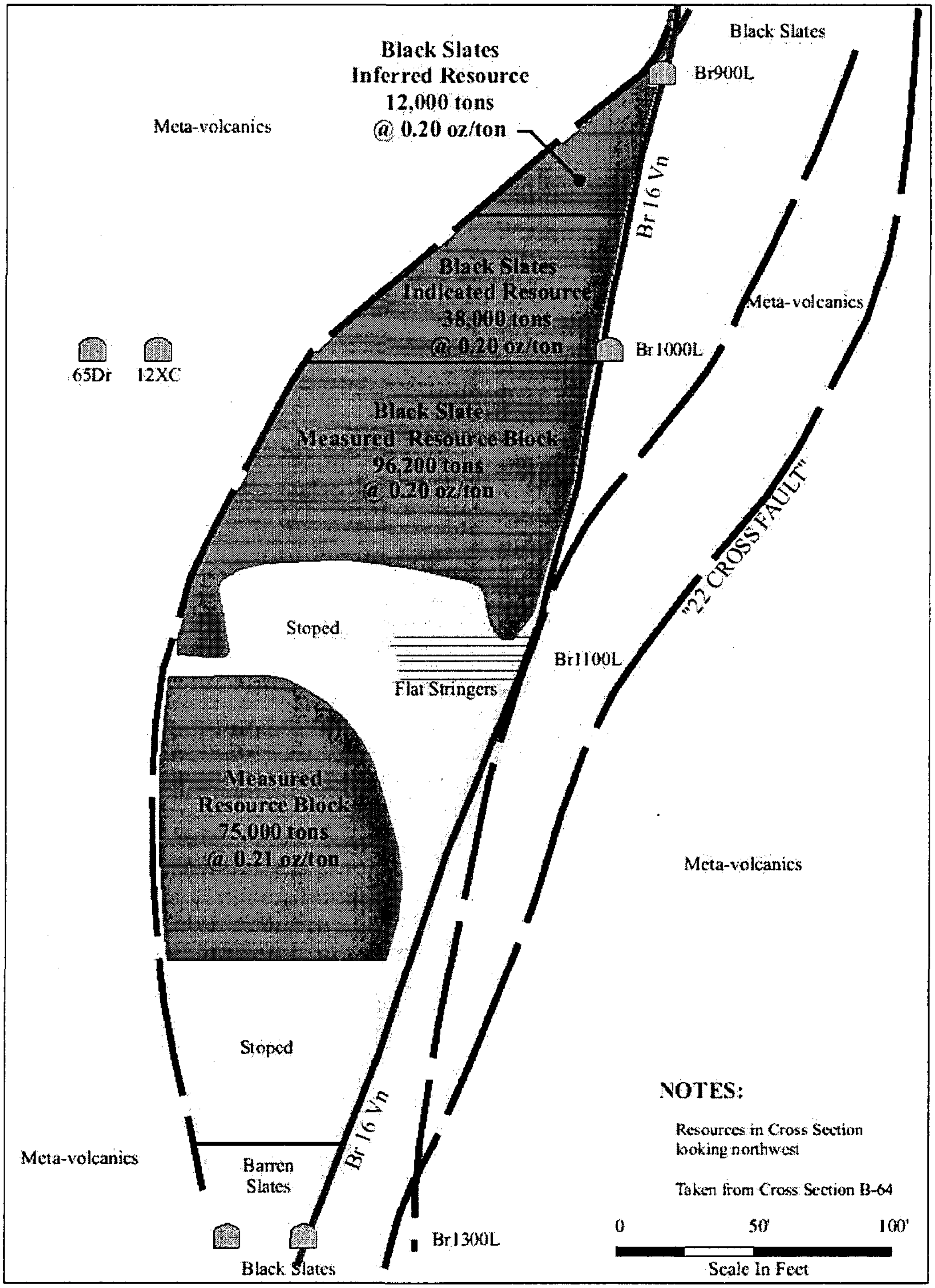
Graphitic black slate bodies (see Figure 9-1) have produced approximately 5% of the gold at the Idaho-Maryland Mine. The mineralized black slate bodies develop exclusively out into the hanging wall of a tabular quartz vein, coincident with an important set of northwest-trending, steeply dipping cross faults. Three known mineralized slate bodies range from 20 ft to 100 ft in thickness and constitute large bulk-mineable oreshoots in the mine. The maximum dimensions are 300 ft in vertical height and horizontal length. Very coarse gold is contained within a stacked array of highly graphitic flat fault planes of 0.2" to 2.0" thick, flat quartz veinlets that cut the steeply dipping meta-sediments. The host rock ranges from slate to medium-grained wacke. The only reported gangue mineral was trace vein carbonate. Accessory fine-grained pyrite occurred in minor amounts up to 1%. The ore mineral was coarse particulate free gold. Flat plates up to 3" x 4" in dimension without vein quartz were found "puddle" in low spots along highly graphitic flat planes. The gold tenor of this ore averaged 0.20 to 0.25 oz/ton. Mill records indicate that recoveries of gold from black slate ores averaged 80%, the highest for all the mineralization types.

9.1.3 Mineralized Diabasic Slabs

Mineralized diabasic slabs (see Figure 8-1) have produced approximately 3% of the gold mined from the Idaho-Maryland deposit. The mineralized diabasic bodies are elongate melange slabs that have no predictable occurrence within the mine. They were generally discovered in exploratory core drilling and crosscuts. Mineralized diabasic slabs range from 3 to 36 ft in thickness, with a maximum length of 400 ft measured along the shallow plunge of the body. Diabasic slabs occur throughout the Idaho Deformation Corridor but only become mineralized where they are cut by strong faults on their bottom end or have strong faults along their footwall contacts.

Mineralized versus unmineralized diabase bodies are easily distinguished. The diabase is visually massive and the igneous textures are holocrystalline and well-preserved where unmineralized. Igneous textures become vague and chlorite content increases as a ground mass constituent imparting a green color to the mineralized diabase. The chlorite can have a preferred orientation, which can impart a faint foliation to the massive diabase (Schlberg, 1936). Pyrite is ubiquitous in mineralized diabase as subhedral to euhedral cubes with a unique embayed "moth-eaten" appearance. Regardless of grade, gold occurs in coarse pieces in this mineralization type. In some cases, the gold particles can be nearly the entire width of the thin quartz veinlet hosting it. Quartz veinlets displaying slip planes on one or both sides are considered favorable, demonstrating the presence of episodic fault displacement.

Figure 9-1: Mineralized Black Slate Deposits – Br 16 Vein Area



Stringer zones of quartz veinlets can constitute up to 10% of the volume. Gangue minerals included abundant carbonate phases, chlorite, and sericite. Euhedral cubic pyrite was the only reported accessory mineral, and gold was the only ore mineral. The gold tenor of mineralized diabase was 0.10 to 1.00 oz/ton for individual bodies. Large resources of this type remain in place at the Idaho-Maryland with most grading 0.10 to 0.22 oz/ton.

9.1.4 Mineralized Phyllonites

Mineralized phyllonites are laminar to braided, carbonate-sericite-chlorite-pyrite altered proto-mylonites hosted within the serpentinite melange matrix or mafic meta-volcanics. At the Idaho 2000 Level, the Idaho 3 Vein showed rapid gradation from a vein quartz lode to a mineralized schist lode, with stringer zones of quartz veinlets constituting 0% to 10% of the volume. Gangue minerals include abundant carbonate, chlorite, and sericite. The lone accessory mineral is disseminated euhedral porphyroblastic pyrite. The gold tenor of the mineralized schists averaged 0.10 to 1.0 oz/ton in individual stopes.

9.2 Industrial Minerals Resources (Ceramics Feedstock Material)

One of the main criteria for suitable feed rock/minerals for the Ceramext™ process is overall composition. The key to high temperature extrusion is to develop a liquid silicate phase that provides the plasticity needed for extrusion and forming to occur. There must be an adequate amount of liquid, and its viscosity must be low enough to allow the overall viscosity of the liquid/solid mix to support extrusion. This is influenced primarily by temperature. In general, if there are fluxing oxides such as Na_2O and/or K_2O, liquid forms at workable temperatures and very acceptable viscosities result. In the Idaho-Maryland case, most of the rock/tailings materials contain major amounts of the sodium-rich feldspar albite. This provides the needed liquid at elevated temperature, even though other components in the rock/tailings, such as quartz, are very refractory and generally remain as crystalline phases during processing.

The Lower Volcanic Unit (LVU) of the Lake Combie Complex contains a large volume of rather homogenous, albite-rich, refractory element-poor material in the form of metamorphosed plutonic, hypabyssal intrusive, and related extrusive units. These mafic to intermediate rocks are located in the Brunswick Slab. The primary rock types in the area outlined as a potential ceramics feedstock resource are 70% meta-andesite hypabyssal intrusions and flows, 17% meta-diabase and 9% meta-gabbro. The defined deposit area contains only a small number of thin shear zones and faults.

9.2.1 Meta-Andesite

Metamorphosed andesite (including basaltic andesite) comprises volcanic flow and flow breccia units, tuffs and related hypabyssal intrusions. Whole rock analyses show silica (SiO_2) contents ranging from 47 to 55 wt. %, sodium (Na_2O) contents of 3 to 4 wt. %, and sodium to calcium ratios (Na_2O:CaO) of 0.28 to 0.65. The average specific gravity is 2.84. The meta-andesite is situated mostly in the eastern half of the resource.

Meta-andesite hypabyssal intrusions: Andesitic hypabyssal intrusive rocks appear to be the most abundant type of meta-andesite. The rocks are non-porphyritic to porphyritic and very fine-grained. They range from having no foliation to being moderately foliated. Primary alteration minerals are chlorite and carbonate, with minor sericite, albite, epidote and silica. Only trace sulfides are present (pyrite and rare pyrrhotite).

Meta-andesite flow and flow breccia units: The flow and related breccia rocks are the second most abundant type of andesitic rocks in the deposit. Flows are the predominant phase, which are intercalated with narrow flow breccia zones. These porphyritic to aphanitic rocks are massive (unfoliated) to schistose. Primary alteration is chlorite and carbonate, with local minor albite, silica, sericite and epidote. Trace to 2% sulfides are present (pyrite and rare chalcopyrite).

9.2.2 Meta-Diabase

Metamorphosed diabase intrusive units consist of aphanitic to porphyritic massive sills and dikes. Primary alteration minerals are carbonate and chlorite, with minor albite. Sulfide content ranges up to 5% and comprises pyrite and trace chalcopyrite. Whole rock analyses show a tight SiO_2 range of 49 to 52 wt. %, 2.5 to 3.5 wt. % Na_2O, and sodium to calcium ratios (Na_2O:CaO) of 0.22 to 0.37. Average specific gravity is 2.91. The meta-diabase units are more abundant towards the center of the deposit.

9.2.3 Meta-Gabbro

Metamorphosed gabbro units comprise mostly leucocratic phases. Units are variably porphyritic and range from being massive to displaying an oriented fabric. This fabric could be relict cumulate layering or represent a foliation. Alteration consists of sausserization to albite, carbonate, chlorite and lesser sericite. Trace sulfides are observed (pyrite). Magnetite is ubiquitous. Whole rock analyses show a tight SiO_2 range around 48 wt. %, 1.7 to 2.2 wt. % Na_2O, and sodium to calcium ratios (Na_2O:CaO) of 0.14 to 0.22. Average specific gravity is 2.97. The meta-gabbro is most common at the western end of the resource.

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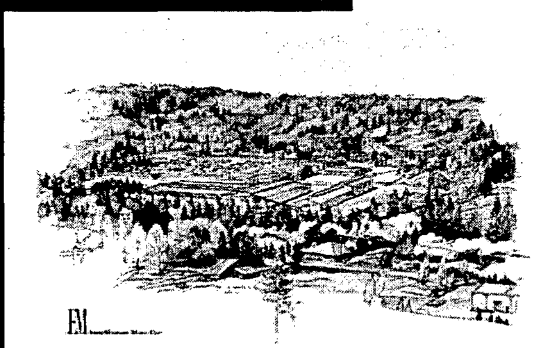
SECTION 10



Exploration

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10.0 EXPLORATION

Exploration at the Idaho-Maryland project consisted of various components: an extensive geologic evaluation program during 1994 through to 2002, surface diamond drilling during 2003 and 2004, and surface mapping and sampling in 2004.

The evaluation was possible because of the excellent and comprehensive preservation of the Idaho-Maryland mine and mill records. These records are exhaustive and essentially complete, and were used to generate a consistent, property-wide structural geology model and vein set stratigraphy. Unmined mineralization was identified along underground workings and in historical diamond drill holes. Interpretation of the updated geologic model defined new vein sets and extensions of known vein sets. These were categorized for mineral resource estimates and future exploration.

Surface diamond drill programs were executed in 2003 and 2004 to test the structural geologic model and near surface gold mineralization targets, and in 2004 for access ramp geotechnical information and ceramics feedstock confirmation. The drill programs and results are discussed in Section 11.

The surface mapping and sampling work consisted of a traverse over the meta-volcanic and intrusive units that comprise the Brunswick slab. Seven surface exposures were found, located by a Trimble GeoTX GPS instrument, and mapped and sampled. This work was done in support of the ceramics feedstock resource estimate.

10.1 Evaluation Data

The available key historic data consisted of:

- 3,200 mine maps and drawings, including 1,257 linen maps (1" = 50 ft assay plans, geology plans and stope plans, 1" = 100 ft geologic cross sections), including exploration drill hole geology and assays plotted on maps.
- 1,100 photographs (surface and underground)
- monthly development reports for 1921 to 1956
- monthly geological summary reports for 1936 to 1942
- eight ledgers of development and stope sampling assays
- assay reports of diamond drilling, channel samples and muck car samples
- general manager's and mine superintendent's reports for 1947 to 1953
- mill production reports and cost summaries for 1934 to 1956.
- petrographic studies on 70 wallrock and gold mineralized samples.

The main underground levels and winzes were measured and input into a 3-D wireframe computer model using Vulcan® and MineSight®.

10.2 Gold Mineralization

10.2.1 Data Review Results

The review of the historic data yielded a revised, comprehensive geological model for the Idaho-Maryland project. Details are described in Sections 7, 8, and 9. Results from the review directed the 2003 and 2004 diamond drill programs. Key results are:

- Barren blooms of intense carbonate-sericite-chlorite alteration leakage extend for several hundred feet upward from all of the known, large, high-grade oreshoots developed at the Idaho-Maryland mine.
- The concept of tectonic fragments or slabs within the Spring Hill Tectonic Mélange (e.g., Brunswick slab, Fulton slab) to explain location, arrangement, and variability in strike and dip of veins.
- Consistent structural interpretation, on both a property and local (stope) scale. Key in this interpretation is the Idaho Deformation Corridor and its make-up of a braided network of high-strain zones, and definition of the Morehouse Fault as an arcuate, structure along the Brunswick tectonic slab contact.
- Definition of the L Fault as the north boundary of the Idaho-Deformation Corridor, generator of numerous, blind high-grade oreshoots which branch downward into the hanging wall, and the possible connection at depth of the L Fault and projected north contact of the deep Fulton Slab.
- Development of productive, high-grade gold-quartz vein sets in bowtie arrays at and adjacent to bench dislocations in the Brunswick Slab contact.
- Development of a deposit type definition for the Idaho-Maryland that forms the basis for the positive exploration potential of new mineralized veins or structures. Four structural features are defined as potential hosts to mineralized vein sets (Figures 7-3 and 8-1):
  1. Boudinage neck features in the serpentinite matrix of the mélange unit
  2. Tectonic slabs in the serpentinite matrix of the mélange unit
  3. Flexures and irregularities in the plane of key fault zones that create shattered, quartz stockwork zones which can host large, more homogeneous, lower grade blocks

4. High-grade vein arrays localized in association with bench-like dislocations along the meta-volcanic Brunswick Slab-serpentinite mélange matrix contact.

The revised interpretation is consistent with the observation of variable to arcuate vein strike orientations and steep to very shallow dips and plunges within these same features.

10.2.2 Discussion

The revised Idaho-Maryland geologic model (see Section 8.0) allows Emgold to evaluate areas among the known structures and veins for new vein set targets. Carefully designed multiple drill hole programs will be necessary to effectively test these targets in light of the complex geology and variable geometry of the mineralized veins. A schematic of the types of targets available are represented in Figures 7-3 and 8-1.

Exploration targets and the potential for new discoveries at the Idaho-Maryland project can be divided into seven large groups according to the dominant structure controlling mineralization. The structural features listed in order of decreasing importance are (1) the Idaho Deformation Corridor, (2) large individual mélange slabs, (3) Weimar Fault, (4) Morehouse Fault, (5) Clipper Creek Thrust, (6) Golden Gate Antiform, and (7) the Grass Valley Fault. Each structural feature has specific targets in known veins and further conceptual geological targets.

However, additional testing from surface can still be done, most of the exploration and delineation effort towards identifying additional gold mineralization will have to be executed from underground stations. Best areas for relatively shallow, higher-grade mineralization occur around the Idaho and Eureka shafts, south of the Round Hole shaft, and Loma Rica Ranch, based on the reinterpreted geology and occurrence of inferred resource blocks. Access for the initial underground drilling would be from the proposed exploration/production decline. The proposed underground work is discussed in more detail in Section 19.

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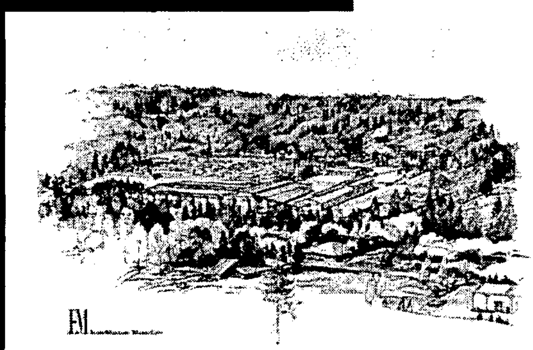

SECTION 11

Drilling

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11.0 DRILLING

11.1 Historic Drilling

During mining of the Idaho-Maryland deposits, exploratory and delineation diamond drilling regularly took place. Eleven hundred holes totaling 230,000 ft were diamond drilled, commonly to a 0° dip (horizontal). Core diameter was " (E-size). Hole traces were put onto the assay, stope, and various geology plans, as was all other information. No drill logs were observed.

Down hole surveys were not conducted, and deviation of the drill holes was common. Recorded in the geology monthly reports were experiences such as driving an underground heading on a drill hole only to find that the hole soon curved significantly from the planned orientation. The deviation was not consistent, and so could not be predicted. This observation was one of the main reasons AMEC recommended that mineral resources defined by historic drilling alone should be classified as inferred mineral resources (see Section 17).

No core was preserved from past mining operations at the Idaho-Maryland Mine.

11.2 2003 / 2004 Drilling

Diamond drill holes are becoming the principal source of geological and grade data for the Idaho-Maryland project. Drilling from surface sites commenced in three phases: summer 2003 (gold targets), spring 2004 (gold targets) and summer 2004 (geotechnical and ceramic feedstock data). Drilling totals 21,335 ft in 31 drill holes for gold exploration and 3,537 ft in 7 drill holes for the geotechnical and ceramics feedstock work. A list of the project drill holes, together with their coordinates and lengths, is provided in Table 11-1.

Drilling was done by wireline method with H-size (HQ, 2.5 in nominal core diameter) equipment using a single drill rig. Collar locations of the core holes were surveyed by Idaho-Maryland staff with a Trimble GeoXT GPS unit. Downhole surveys of all core holes were conducted at 100 ft intervals with a Reflex E-Z Shot digital instrument. Additionally, the geotechnical drill holes were drilled using oriented core (EZ Mark oriented core device). Upon completion, the collar and anchor rods were removed and the hole was abandoned to California regulation standards, and the site rehabilitated.

Standard logging and sampling conventions were used to capture information from the drill core. The core is logged in detail onto electronic MS Access logging "sheets", and the data was then transferred into the project database. The core was digitally photographed before being sampled.

Table 11-1: Idaho-Maryland Project 2003 and 2004 Drill Holes

Drill Hole No.	Easting (ft)	Northing (ft)	Collar Elevation (ft)	Total (ft)	Depth (m)	Azimuth	Dip	Target
IDH001	3770.7	9657.5	12495	592.5	180.6	50	-59	Au
IDH002	3770.7	9657.5	12495	319.0	97.2	88	-45	Au
IDH003	3770.7	9657.5	12495	668.0	203.6	90	-26	Au
IDH004	3770.7	9657.5	12495	940.0	286.5	71	-26	Au
IDH005	5332.1	9256.8	12522	757.0	230.7	2	-76	Au
IDH006	5367.5	9275.0	12522	1706.0	520.0	226	-45	Au
IDH007	5403.5	9283.0	12522	139.0	42.4	38	-69	Au
IDH008	5405.0	9284.5	12522	678.0	206.7	39	-56	Au
IDH009	5408.0	9294.0	12522	603.0	183.8	358	-60	Au
IDH010	5418.0	9293.0	12522	747.0	227.7	326	-59	Au
IDH011	5419.0	9291.0	12522	1248.0	380.4	334	-74	Au
IDH012	5458.0	9312.0	12522	302.0	92.0	64	-53	Au
IDH013	5459.0	9313.0	12522	293.0	89.3	64	-70	Au
IDH014	5349.0	9273.0	12522	406.0	123.7	353	-79	Au
IDH015	5349.0	9272.0	12522	483.0	147.2	316	-61	Au
IDH016	3682.0	9674.0	12495	1087.0	331.3	64	-65	Au
IDH017	3683.8	9674.8	12495	1038.0	316.4	63	-49	Au
IDH018	3684.7	9675.3	12495	887.0	270.4	67	-41	Au
IDH019	3683.5	9675.3	12495	807.0	246.0	57	-55	Au
IDH020	3684.5	9676.8	12495	596.0	181.7	58	-40	Au
IDH021	3682.4	9674.4	12495	799.0	243.5	60	-70	Au
IDH022	3682.4	9675.8	12495	767.5	233.9	17	-55	Au
IDH023	3682.7	9676.8	12495	607.0	185.0	12	-41	Au
IDH024	3681.9	9674.4	12495	758.0	231.0	13	-70	Au
IDH025	3680.8	9676.6	12495	466.0	142.0	329	-44	Au
IDH026	3681.2	9675.7	12495	530.0	161.5	342	-65	Au
IDH027	3681.7	9674.2	12495	428.0	130.5	339	-77	Au
IDH028	3681.5	9675.5	12495	434.1	132.3	350	-45	Au
IDH029	3681.6	9674.3	12495	576.1	175.6	349	-59	Au
IDH030	3681.6	9674.3	12495	817.0	249.0	117	-60	Au
IDH031	3681.6	9674.3	12495	857.0	261.2	117	-55	Au
IDH032	6166.5	8050.5	12587	707.0	215.5	39	-44	Geotech
IDH033	6128.9	7628.8	12580	708.0	215.8	129	-45	Geotech
IDH034	5729.3	8031.0	12574	706.0	215.2	256	-40	Geotech
IDH035	5735.5	8018.0	12572	519.3	158.3	256	-40	Geotech
IDH036	6092.3	8011.9	12585	387.4	118.1	271	-44	Geotech
IDH037	4480.3	8257.6	12531	307.0	93.6	111	-40	Geotech
IDH038	4479.8	8256.8	12527	203.0	61.9	297	-44	Geotech

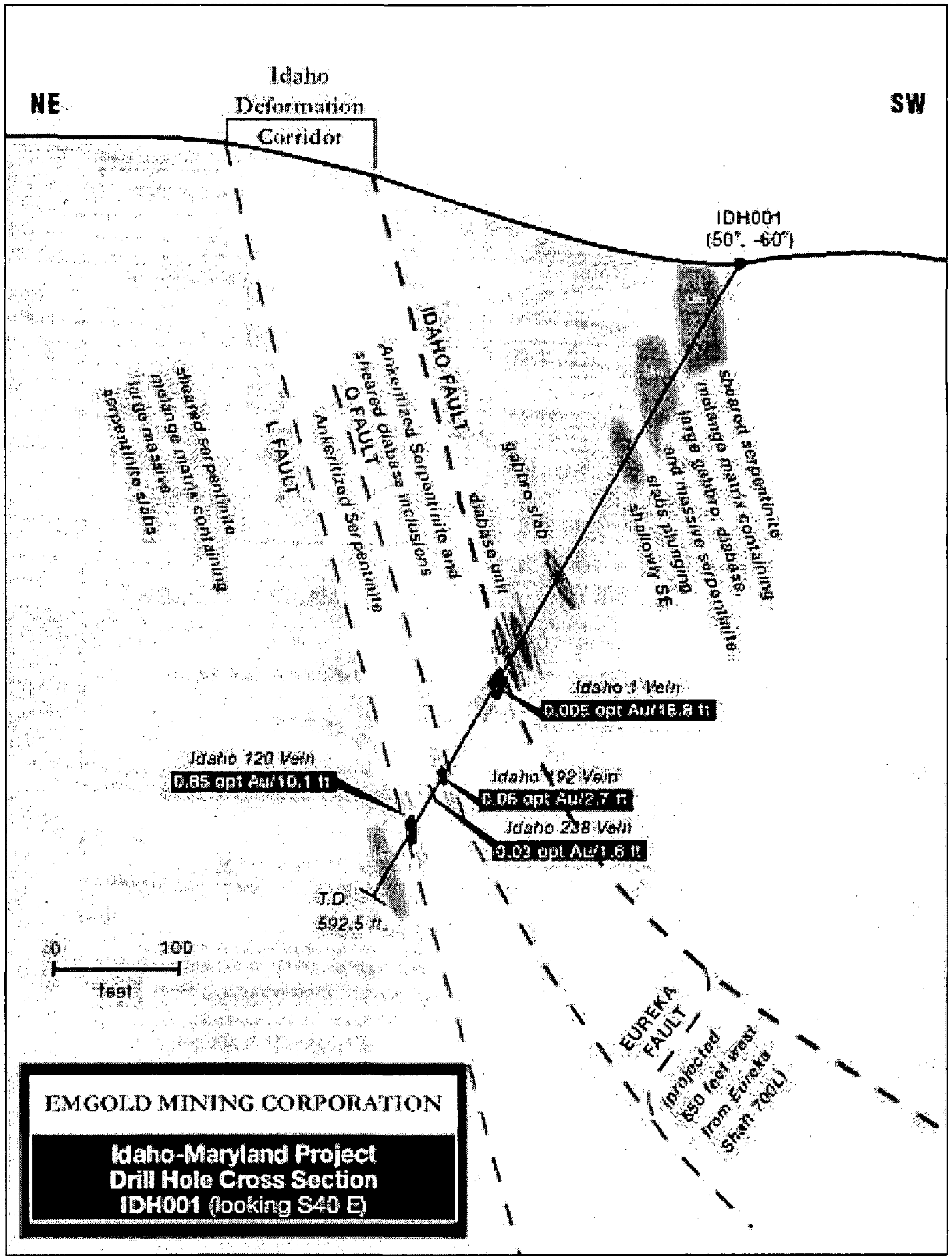
AMEC reviewed the core logging procedures at site and the drill core was found to be well handled and maintained. Material was stored under cover (in a secure warehouse facility) in core racks. Data collection was competently done. Idaho-Maryland maintained consistency of observations from hole to hole and between different loggers by conducting regular internal checks. Core recovery in the mineralized units was excellent, usually between 95% and 100%. Very good to excellent recovery was observed in the mineralized intrusive sections checked by AMEC. Overall, the Idaho-Maryland drill program and data capture were performed in a competent manner.

11.2.1 Gold Mineralization Targets

Drilling on gold targets was carried out from two locations (sites A and B, about 1,500 ft apart) and tested various blind structural targets. Key findings from the drilling are:

- Confirmation of the serpentinite – matrix tectonic melange zone geologic model for the Idaho-Maryland Mine. The localization of gold-quartz veining (1) along melange slab contacts and (2) in association with bench dislocations along the Brunswick Slab contact was also corroborated.
- Nearly all gold is coarse particulate in nature and confined directly to vein quartz and phyllonites of the vein shears. Values were tightly confined to structures with little or no dispersion of gold into the wallrocks. Coarse particulate gold was also identified within micro-fractured diabase and serpentinite adjacent to very strong mineralized faults. Chloritization, the associated destruction of the crystalline igneous textures, and development of porphyroblastic pyrite overgrowths are diagnostic for the auriferous diabases.
- In 2003, the drilling intersected high-grade mineralization at depth in the Idaho 120 Vein, several hundred feet beneath an outcropping barren carbonate alteration bloom (see Figure 11-1). Hole IDH001 cut 10.1 ft @ 0.93 oz/t Au in a complex vein structure. In 2004, follow up drilling tested westward and at higher elevations from the high-grade intercept. Evidence of old mining was seen at higher elevations whereas the mineralization quickly pinched off to the west. The drill position would not allow testing to depth and eastward thus the target remains open along strike and down rake to the east. Further delineation of this target will be planned for the 2005 surface drilling program.
- Drilling revealed that the keel of the Brunswick Slab is shaped different than anticipated. Hole IDH006 did not intersect the Idaho 1 Vein at the keel of the Brunswick Slab, where it was projected to occur at 1,000 ft depth. This implies a steeper plunge for the keel from surface to 1,100 ft depth and a considerable flattening of the plunge below 1,100 ft depth, and extending eastward toward the Idaho 1500 Level.

Figure 11-1: Drill Hole Cross Section – Looking S40E



Significant intervals intersected in the 2003 and 2004 drill campaigns testing gold mineralization potential are shown in Table 11-2.

Table 11-2: Significant Gold Mineralized Intersections, 2003 – 2004 Drill Campaigns

Hole	From (ft)	To (ft)	Interval (ft)	Au oz/ton	From (m)	To (m)	Interval (m)	Au (g/t)	Comments
IDH001	528.2	538.3	10.1	0.93	161.0	164.1	3.1	31.9	free gold
IDH003	482.5	483.4	0.9	0.21	147.1	147.4	0.3	7.2	free gold
IDH009	130.8	133.8	3.0	0.17	39.9	40.8	0.9	5.8	-
	187.0	193.0	6.0	0.17	57.0	58.8	1.8	5.8	free gold
IDH011	213.0	216.0	3.0	0.17	65.8	66.7	0.9	5.8	-
IDH017	862.5	866.0	3.5	0.26	263.0	264.1	1.1	8.9	-
IDH019	556.3	562.3	6.0	0.05	169.6	171.4	1.8	1.7	free gold
IDH022	369.0	375.0	6.0	0.05	112.5	114.3	1.8	1.7	free gold
IDH024	395.0	398.0	3.0	0.31	120.4	121.3	0.9	10.6	free gold

11.2.2 Geotechnical Drilling (Ceramics Feedstock Definition)

Geotechnical drilling was conducted to obtain ground stability data for the proposed mine access ramp (see Section 19). Holes were angled downward at 40° to 45° from the horizontal to maximize the areas examined in the directions of the decline route. In addition, data were obtained to determine the usability of the block of meta-volcanic rocks for ceramics production. All drilling was contained in the Brunswick Slab.

The dominant rock types intersected were andesite volcanic flows, flow breccia, and hypabyssal feeder units intruded by diabase intrusive units. Chemically they are quite similar and would be considered all the same unit with respect to ceramics production. Gabbro units were intersected around the proposed portal area but otherwise only constitutes a minor component of the drilled region. Visually quite distinctive, the gabbro could easily be segregated during mining should it become necessary. A key observation in all the drill holes (outside the weathered surficial zone which will not be considered for ceramics production) is the general absence of any broken core and/or gouge intervals, foliated or sheared zones, and fractured or veined areas. The core area of the Brunswick Slab is shown to be a massive, undeformed, essentially monolithic unit of mafic composition.

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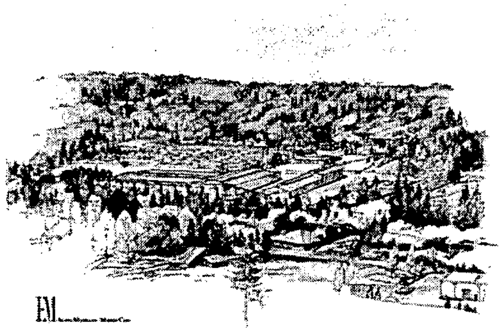

SECTION 12

Sampling Method and Approach

12.0 SAMPLING METHOD AND APPROACH

12.1 Gold Mineralization

Sampling of the half cores was performed by Idaho-Maryland staff in a secure core logging and storage facility. Sample size was critical due to the coarse particulate nature of the gold (The sample size was optimized to allow for multiple check assays, if required, as the use of large assay pulps was necessary). The target sample size was 3 ft, with the minimum being 2.5 ft, and 3.3 ft the maximum.

The core ends would be matched through all of the boxes, and fractured sections wrapped in duct tape to preserve geological information and reduce core loss during the cutting process. Core was halved with a wet saw, using continually running fresh water, and cut along the same line of orientation, which provided excellent angular relationship data for structural geologic interpretation. When strongly mineralized sections of core were cut, a plastic tray was inserted into the saw pan and saw cuttings were collected and panned. The pannings were helpful in alerting staff to the presence of coarse gold and assisted in the review of assay and check assay results.

The half cores within a marked sample interval were put in a sample bag, tagged, and loaded into 55lb (25 kg) shipping sacks and secured. The samples from the split core remained in the logging facility until shipped to the assay laboratory. Samples were shipped in one of two manners. Idaho-Maryland staff transported samples to the assay labs in Nevada or the representatives from the assay lab came to the Idaho-Maryland facility to pick up samples, depending on the sizes of the shipments. The majority of the samples were shipped to American Assay Laboratory in Sparks, Nevada and check assays were sent to the Barrick Goldstrike Laboratory in Carlin, Nevada.

12.2 Ceramic Feedstock

All cores were cut in half with a diamond saw at Idaho-Maryland's core logging facility. The half cores were primarily collected to conduct whole rock analyses of different rock types and extrusion testing into billets. Remaining half cores were combined into a bulk composite sample for ceramic production testing.

PRELIMINARY ASSESSMENT TECHNICAL REPORT

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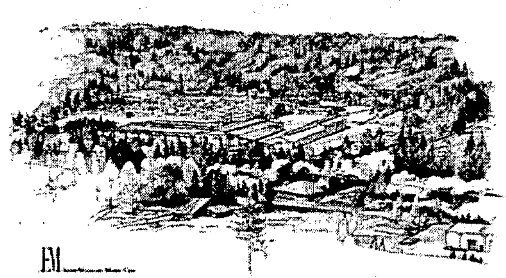
SECTION 13



Sample Preparation, Analyses and Security

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13.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY

13.1 2003 – 2004 Gold Exploration Samples

The primary sample preparation and analyses were performed by American Assay Laboratory of Sparks, Nevada. Historic records for the Idaho-Maryland mine noted coarse gold in all ore types, thus Idaho-Maryland chose to be conservative and have all samples analyzed using screened metallics fire assay methods. The flowchart of the preparation and analysis process is shown in Figure 13-1. The laboratory prepared two pulps from each sample. One 500 g sample was for fire assay analysis and a 100 g pulp was prepared and returned to Idaho-Maryland for gold panning. Panning of the 100 g pulp by Idaho-Maryland staff provided (1) a cursory check on the lab, (2) allowed collection of gold particle size, shape, and population information, and (3) helped direct the ongoing core drilling program when lab analysis turn-around time was slow. The 500 g pulp was analyzed for gold only, utilizing screened metallics fire assay methods. All pulps and coarse rejects were saved by the lab and delivered back to the Idaho-Maryland core facility.

Figure 13-1: Sample Preparation and Assay Procedure Flowchart, Primary Laboratory

```
                              Dry Sample
                                  |
                                  |
                 Jaw Crush (80% to minus 10 mesh)
                                  |
                                  |
          Rotary Split (for 500 gram and 100 gram pulps)
                 |                                  |
                 |                                  |
          500 gram pulp                       100 gram pulp
       Pulverize with LM-2                 Pulverize with LM-2
    (95% passing minus 150 mesh)       (95% passing minus 150 mesh)
       Screen +150 mesh fraction               hold for Emgold
          |                 |
          |                 |
30 to 60 grams          Rotary Split
fire entire + 150 mesh   -150 mesh fraction
screened fraction       |          |
gravimetric finish      |          |
          |         2 AT Fire    2 AT Fire
          |         gravimetric  gravimetric
          |          finish       finish
          |             |          |
          |             |          |
          |        Average both 2 AT Fires
          |                 |
          |                 |
          |                 |
Combine +150 and –150 mesh results for weighted total gold assay
```

A rigorous QA/QC program has been developed and utilized at the Idaho-Maryland Project. Extra precautions were taken by Idaho-Maryland staff to mitigate the potential for assay variability due to the frequent coarse gold occurrence in the mineralization. The program used Standard Reference Materials (SRMs), blank samples (made from barren massive antigoritic serpentinite), coarse reject and pulp duplicate samples and third party laboratory check assays. Insertion rate of SRMs and duplicates was about 1 in 20 samples. Blanks were only inserted immediately following mineralized intervals.

The SRMs were prepared from gold mineralized material of varying grades, collected from a nearby gold mine to formulate bulk homogenous material. Two groups of material were collected: one with a mean certified value of 0.21 oz/ton Au and the other with a mean certified value of 0.17 oz/ton Au. These materials were used to successfully control the assay quality process.

Blank sample results showed no evidence of gold contamination during sample preparation. One anomalous sample result was due to a sample mix-up; it was checked and corrected in the final database.

Duplicate performance was good to fair, reflecting the coarse particulate nature of the gold mineralization. Performance was worse closest to the detection limit. Patterns on control charts were symmetric about zero, suggesting no bias in the assay process.

Four criteria were used in selection of samples for third party laboratory check assays. These were (i) all assays equal to or greater than 0.01 oz/ton Au, (ii) all samples with free gold panned from 100 g pulp sample regardless of assay value, (iii) all samples with visual similarity to oretypes regardless of assay value, and (iv) 5% of the remaining sample population selected randomly. Results mirrored the primary laboratory duplicate analyses.

AMEC reviewed Idaho-Maryland's QA/QC procedures at site and found them to be strictly adhered to. The gold assay process for the 2003 and 2004 drill campaigns were shown to be in control. The rigorous assaying methodology employed during the these phases of drilling identified mineralization types which will require screened metallics fire assaying in future work. These oretypes include samples containing (i) over ten percent vein quartz, (ii) green chloritized diabase with porphyroblastic pyrite overgrowths, (iii) phyllonites with porphyroblastic pyrite overgrowths, and (iv) about 3 ft of wall rock immediately preceding and after any of the first three types.

13.2 Historic Gold Samples

This project contains an historic database with over 36,000 assays. The assays, which are almost exclusively for gold, were done on samples taken from underground workings (walls and backs from drifts and crosscuts, walls from raises). Many are channels samples; fewer are muck car samples and grab samples. Those from diamond drill holes comprise only a minor portion of the assay database.

The assay data reside as handwritten entries on scale assay plans (1" to 50 ft) for all mine levels. Drill hole assay data accompany the intercepts on these plan maps, and copies of assay certificates are present for the final 10 years of production.

The samples were fire-assayed at former mine site laboratories. No records exist of any QA/QC program. Sample quality can still be inferred, however, by the reconciliation of historic production records to underground sample data. These studies, as well as a recent investigation on mill-to-resource prediction (see Section 17), show that the resource or reserve estimates consistently underestimated the amount of gold produced by milling, a discrepancy most likely reflective of sample size influence rather than laboratory technique. Gold deposits with coarse gold areas are best sampled with large sizes, which was not common practice at the time. Therefore, any estimates made using this historic data should include comparisons with values unadjusted and adjusted for the regular underreporting of grade (i.e., call factor).

AMEC believes that the comprehensive set of assay plans, supported by records of muck car stope samples and mapped geology data, as well as the detailed historical production records, all support the integrity of the assay data for the Idaho-Maryland Mine. These data are deemed suitable for use in mineral resource estimation.

13.3 Ceramics Feedstock Samples

Samples were submitted to Kappes, Cassidy and Associates and Florin Analytical Services, LLC in Reno, Nevada for preparation and geochemical analyses. Tests were conducted to determine the elemental content of each rock type for optimizing the ceramics extrusion process. The whole rock analysis test involved pulverizing the sample to minus 150 mesh, conducting lithium metaborate fusion followed by nitric acid digestion, and semi quantitative ICP analysis for elements, oxides, and loss on ignition. The results were reported as percentages with and without the weight of oxygen. Measurements of total and organic carbon and total sulfur were made utilizing the Leco furnace method. Results are shown in Appendix C.

Extrusion tests were conducted at the Idaho-Maryland ceramics testing facility in Grass Valley, California. Samples were first sent to Kappes, Cassidy and Associates for grinding to minus 100 mesh, and then retrieved by Idaho-Maryland personnel. Representative samples of the rock types were extruded into ceramic plugs using the laboratory-scale extrusion plant. Methods and results are discussed in Sections 16 and 19. Briefly, positive results were achieved for meta-volcanic and diabase samples. Gabbro samples did not perform well and will have to be blended should it become part of the feedstock material.

Testwork has indicated that a 9% gabbro content in the ceramic feedstock is acceptable, and testwork is ongoing.

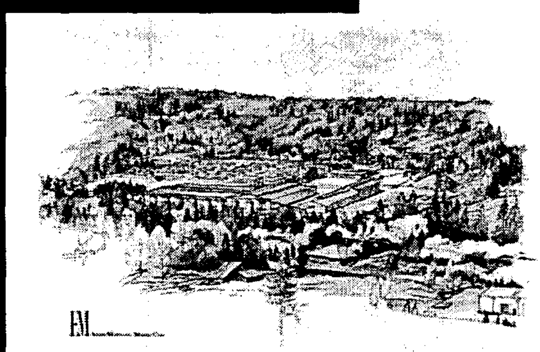
The specific gravity of the rock was measured by Vector Engineering of Grass Valley, California using ASTM method C127 on representative pieces of drill core and surface samples.

A summary of the ceramics product sample testing and protocols has been prepared by Dr. Frahme and is presented in Appendix D.

Preliminary Assessment Technical Report

Idaho-Maryland Mining Corporation

SECTION 14



Data Verification

amec

14.0 DATA VERIFICATION

14.1 Historic Data

Data used in the Idaho-Maryland mineral resource estimate reside on assay plans. AMEC conducted two data transcription checks: one which compared assay values in resource block calculation sheets to the source plan map for various resource blocks throughout the property; and the other which reviewed copies of assay certificates (1946 to 1948) for the Idaho No.1 vein along 2400 Level. In the review of assay values, only five errors were found, but the overall error rate was near zero. No errors were observed in the assay plans.

14.2 2003 and 2004 Data

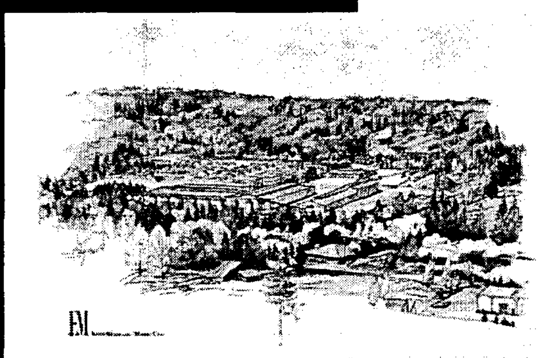
Data compiled during the 2003 and 2004 drill campaigns were checked by AMEC during two site visits. Random database entries were compared to original source documents; no errors were observed.

AMEC concludes that the assay and location data used are sufficiently free of error to be adequate for resource estimation for the Idaho-Maryland project.

PRELIMINARY ASSESSMENT TECHNICAL REPORT

Idaho-Maryland Mining Corporation

SECTION 15



Adjacent Properties

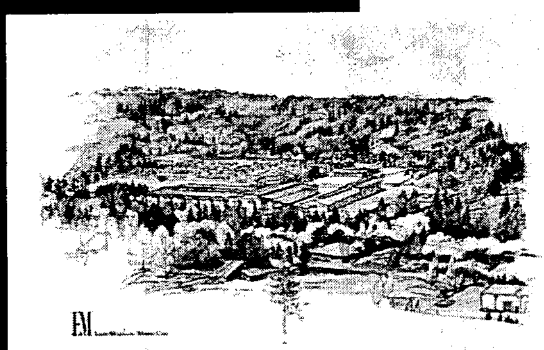
15.0 ADJACENT PROPERTIES

This section is not relevant for the Idaho-Maryland Mine project.

PRELIMINARY ASSESSMENT TECHNICAL REPORT

Idaho-Maryland Mining Corporation

SECTION 16



Mineral Processing and Metallurgical Testing

16.0 MINERAL PROCESSING AND METALLURGICAL TESTING

16.1 Process Description

The overall process will utilize crushing and dry grinding of run-of mine (ROM) material to prepare it for the subsequent ceramics manufacturing process. The ceramics manufacturing process will utilize a new, patented and proprietary process known as Ceramext™ to produce high-quality ceramic tile products. The initial plant capacity will be 1,200 ton/d and will be expanded to an ultimate capacity of 2,400 ton/d. The overall process flowsheet is presented on Dwg. 100-N-0001 and the conceptual plant layout in Dwgs.100-M-0001 and 100-M-0002 in Appendix E.

16.1.1 Crushing, Drying, and Grinding

The crushing and grinding plant will utilize industry-proven technology and equipment for comminution. ROM industrial minerals mined during the driving of the access decline will be crushed in a mobile jaw crusher initially positioned on surface. Muck will be delivered to the crusher by the mine haul trucks. Once the decline has advanced 1,000 ft underground, the mobile crusher will be relocated underground and a conveyor installed to transport crushed material to the surface stockpiles.

Development of the industrial mineral mine will include installation of a permanent underground crusher adjacent to the industrial mineral mining areas. The project schedule calls for this crusher to be operational 3.5 years after the start of mine development. At that time, primary crushing will switch from the mobile crusher to the permanent crusher. This crusher will have a capacity of 2,400 ton/d to match the ultimate mine production rate. An underground storage bin with 2,000 tons of capacity will be developed ahead of the crusher to provide surge capacity.

ROM industrial minerals with a top size of 12" in x 12" x 18" will be trucked from the mine face and dumped into the ROM bin. The material will be drawn from the bin with an apron feeder and fed onto a grizzly ahead of the primary jaw crusher. Smaller material will pass through the grizzly directly onto the conveyor. Grizzly oversize material will feed into the jaw crusher and will be crushed to approximately 80% passing 4". Primary crushed ore and grizzly undersize will be transported on a belt conveyor to a coarse ore stockpile on surface adjacent to the process plant. There will be two stockpiles on surface, each with a total capacity of 8,500 tons. Coarse ore will be reclaimed from the stockpiles via apron feeders installed beneath them and be transferred onto a conveyor feeding onto a double-deck screen. Oversize material from the screen top deck will be fed to a secondary standard cone crusher where it will be crushed to 80% passing 1.0". The secondary crusher discharge will be conveyed back to the double-deck screen for classification. Mid-size material from the screen second deck will be fed to a tertiary short-head cone crusher where it will be crushed to 80% passing 3/8". The tertiary cone crusher discharge will be conveyed back to the double-deck screen for classification.

Screen undersize at 80% passing 3/8" will be fed to a natural gas-fired rotary kiln to reduce the moisture to 1%. The dried material will be conveyed to a high-pressure grinding roll, which will grind the material to 80% passing 150 µm, the particle size required for subsequent ceramics manufacture. The high-pressure grinding roll discharge will be conveyed to a dynamic, air-swept separator for size classification. Oversize material will be directed back to the high-pressure grinding roll, and final size product at 80% minus 150 µm will be transferred to a rotary kiln drier. Efficient operation of the air classification is dependent on a moisture content not exceeding 1%.

The dried ground material will be conveyed via a fully enclosed forced air system to a series of storage silos ahead of the ceramics manufacturing circuits. The dried material will be segregated into different silos based on mineralogical composition.

The primary underground crusher will operate on day shift only. The surface crushing, grinding and drying plant will operate 24 h/d.

The crushing and grinding processes may develop significant levels of dust. The crushing and grinding plant will incorporate an efficient dust collection system to control dust emission. Dust collected will be reintroduced to the circuit ahead of the ceramics manufacturing circuit.

16.1.2 Ceramics Manufacturing

The ceramics manufacturing process will utilize the proprietary Ceramext™ process, which uses vacuum extrusion at elevated temperature to produce ceramic building products.

Ceramic feed material will be drawn from the silos and conveyed to a set of blenders used to mix predetermined quantities of feed material for different end products. From the blenders, the feed material will be conveyed to screw feeders used to meter feed material to a bank of pre-heaters. Each pre-heater will feed multiple ceramic manufacturing lines and will serve to drive off remaining moisture as well as heating the material for the ceramics process. Upon exiting the pre-heaters, the material will be fed into the extrusion and forming process. From the extrusion and forming process, the shaped pieces will be directed to a glazing process or to the cooling furnaces. The cooling furnaces provide a controlled temperature environment to reduce the ceramic product to ambient temperature.

From the cooling furnaces, products will be machine stacked. Flat tile products will be boxed, strapped, and palletized. Shaped tile products, brick, pavers, and block will be strapped and palletized. All packaging operations will be fully automated. Packaged products will be moved to either indoor or outdoor storage areas to await customer delivery

The ceramics manufacturing process will incorporate a number of parallel circuits to produce 1,200 ton/d of ceramic product. The exact number of circuits will be determined during the detail engineering phase. The product mix will include brick, floor, roofing, and decorative tiles as dictated by market requirements at the time of manufacture.

16.1.3 Gold Processing Plant *(Future)*

Depending on the success of the gold exploration activity, a gold processing plant may be added in the future to treat gold ore from the Idaho-Maryland mine. The gold processing circuit will utilize the same crushing, drying, and grinding circuit initially installed for the ceramics process. The gold ore will be crushed and ground to 80% passing 150 µm prior to gold extraction. Industry-proven technology and equipment will be used for gold extraction and recovery.

The grinding circuit product at 80% minus 150 µm will be fed into an agitated tank and mixed with water to form a slurry of approximately 50% solids by weight for subsequent processing. The slurry will be pumped to a centrifugal gravity concentrator to recover gold to a gold-rich concentrate. Tailings discharge from the gravity concentrator will be pumped to a flotation circuit for additional recovery of fine gold particles in the flotation concentrate.

The flotation and gravity concentrates will be combined and pumped to an intensive cyanidation circuit where the gold will be leached into solution. The gold-bearing leach solution will be pumped through an electrowinning circuit where the gold will precipitate onto cathodes. At scheduled intervals, the gold-rich cathodes will be removed and stripped of the gold-bearing sludge. The sludge will be filtered and dried and then be smelted on site in a furnace to produce doré containing approximately 70% to 85% gold. The doré will be transported to a custom refiner to produce refined bullion. The barren solids residue remaining after completion of the intensive leach process will be rinsed to remove any remaining cyanide solution, and then discharged to a holding bin. This material will be transported offsite for treatment. Based on historical gold recovery data and the application of modern gold recovery technology, it is anticipated that overall gold recovery of 95% would be achievable.

The flotation tailings will be pumped to a thickener for dewatering. Process water reclaimed form the thickener will be recycled for re-use in the process. The thickened tails will be fed to a pressure filter for additional dewatering and then fed to the rotary kiln for drying. Dried material will be conveyed to the storage silos ahead of the ceramics circuit.

All material that has come into contact with cyanide will be treated in a cyanide destruction circuit. The cyanide-free slurry or solution is then pumped to the thickener for dewatering.

Gold process tailings not required for underground backfill would be blended into ceramics production. A cemented paste backfill plant will produce fill for the mined stopes.

16.2 Development Plan and Production Rate

16.2.1 Equipment Capacity

Owing to the extensive mine development plan, the production rate of the mine will increase in stages. Accordingly, installation of the surface plant facilities will also be staged to a certain extent to parallel the mine development.

The initial mobile jaw crusher, secondary and tertiary crushing and screening circuits, will have a capacity of 100 ton/h, which will be adequate to crush all material mined during the driving of the access decline. As the mine production capacity expands from 1,200 to 2,400 tons/d, additional drying and HPGR equipment will be installed.

The initial ceramic manufacturing plant capacity will be 1,200 ton/d with capacity expanded to 2,400 ton/d in year 4. The ceramic manufacturing equipment has a much smaller unit capacity, and so multiple manufacturing lines will be required. In this case, the most cost effective approach is to install only the number of lines required initially to support a feed rate 1,200 ton/d and then install the additional lines at the time of expansion.

16.2.2 Materials Handling – Surface

The initial mine plan calls for production to be ramped up from an initial 300 ton/d to 2,400 ton/d over a four-year period. The initial plant capacity will be 1,200 ton/d followed by an increase to 2,400 ton/d at the start of Year 4. Driving of the access decline will start at the same time as construction of the ceramics plant, resulting in a requirement to stockpile crushed material on surface in a temporary stockpile until the process plant is commissioned. It is estimated that approximately 175,000 tons will be placed in the temporary stockpile. The stockpile would be limited to a maximum height of 12 ft, and would cover an area of 325,000 ft^2.

The initial capacity of the process plant will exceed the mine production capacity; hence, a shortfall in mine production will be made up by drawing from the temporary surface stockpiles. The material will be reclaimed from the temporary stockpile by front-end loader and dumped into haul trucks, which will haul the material to the one of the two smaller stockpiles adjacent to the crushing plant. This material will be drawn from the stockpile and conveyed to the secondary crushing plant.

The surface site has a designated area of 885,000 ft^2 available for ceramic tile storage. Prior to commissioning of the process plant, this area will be available for temporary storage of crushed rock from underground. The crushed material will be transported from the mine to the stockpile by haul truck.

Once the process plant is commissioned, crushed rock from underground will be conveyed directly to one of two smaller permanent stockpiles adjacent to the surface crushing plant. This material will be drawn from the permanent stockpile and fed to the secondary crushing plant.

16.3 Metallurgical and Process Testwork

16.3.1 Feed Material Evaluation for the Ceramext™ Process

A substantial number of materials from the Idaho-Maryland geotechnical drilling program and from surface exposures have been evaluated for their suitability for commercial exploitation using Ceramext™ technology. These evaluations have included historic Idaho-Maryland mine tailings and a variety of metavolcanic and intrusive rocks derived from the core samples and other exploration work. In addition to historic mine tailings, 25 different rock samples and a composite judged to be representative of the industrial minerals resource were included in the evaluation. The goal was to determine which of the materials produced during mine development and potential future gold processing is suitable for use in manufacturing ceramic products.

An extensive evaluation of the feed materials has been carried out. Each material has been subjected to whole rock chemical analysis, while X-ray diffraction (XRD) has been used to determine the crystalline phases present in the raw materials and resulting ceramic products. Evaluation has also included extrusion of ceramic billets processed at elevated temperatures using Ceramext™ technology. Physical properties of these billets have been measured, including density, porosity, water absorption, and strength. Strength was measured via modulus of rupture (MOR), using ASTM- based (American Society for Testing and Materials) test procedures. Most of the evaluation work was carried out using laboratory-scale Ceramext™-based equipment. In addition, initial work has been done to process materials in a second generation Ceramext™ extruder, which demonstrates continuous production processing on a pilot scale.

All of the raw materials processed and evaluated by Idaho-Maryland appear fully suitable for commercial use in the Ceramext™ process. Testing has shown that materials can be produced with high strength and low porosity, both of which properties are important for high-quality ceramic products. It must be pointed out that the optimum processing conditions for each composition and material tested have not been fully determined as yet, with the exception of the composite blend. Processing conditions were close to the optimum, but each material requires slightly different processing parameters because of slight differences in composition and mineralogy. The fact that superior ceramic materials have been produced even without this optimization is important. As mentioned, the optimum processing temperature was determined for a composite of the rock types expected from the industrial minerals resource mine development. The composite was blended to approximate the expected overall composition of the feedstock resource. Finally, the pilot-scale, continuous extruder produces ceramic materials with superior properties for any given raw material type as compared to processing in the lab-scale system. Only historic mine tailings have been processed in this pilot-scale unit to date.

Modulus of rupture (MOR), which is a measure of mechanical strength, was measured for ceramic billets representing the different types of rock. A wide range of values was exhibited, dependent primarily on processing conditions. Measured values are comparable or higher than most commercial tile and brick materials on the market. The lower strength materials had MOR values generally around 3,000 to 4,000 psi, and the strongest materials produced MOR values comparable to or higher than ceramic porcelain, the premier material for ceramic tile products. Historic mine tailings processed using the second-generation continuous extruder had MOR values averaging 8,600 psi. This is a significant result, since this extruder mimics the operation of eventual production units. Water absorption values for the other bodies tested were in the 15% range for the lowest strength materials and around 2% to 3% for the strongest materials. Materials processed through the continuous pilot unit had water absorption values averaging 0.6%. With optimization of the pilot-scale processing, even higher strength and lower water absorption values can be expected.

An outline of the sampling and testing protocol has been prepared by Dr. Frahme, and is included in Appendix D.

16.3.2 Gold Recovery Testwork

Preliminary level gold gravity recovery tests utilizing both Knelson and Falcon lab concentrators were performed on several samples of old Idaho-Maryland tailings and highly mineralized material found on waste rock dumps. Test recoveries were generally in the range of 70% to 80%. This gravity testwork is of interest because it indicates that new gravity technology may be more efficient than the methods used during the historical operation; however, it is not possible to accurately correlate the origin of the samples with respect to the mine workings, and so the value of these initial results are limited. Once a gold resource is defined, additional gravity and general metallurgical testwork would be required to fully characterize the metallurgical response and gold recovery to be expected.

16.4 Process Operating Basis

The process operating basis is presented in Table 16-1. The criteria for crushing, grinding, and the future gold process are based on information supplied by Idaho-Maryland, typical industry practice, AMEC in-house data, and historical operation at the Idaho-Maryland mine.

Table 16-1: Process Operating Basis

Detail	Units	Initial Plant	Expanded Plant
Plant capacity	t/d	1,200	2,400
Plant operation	h/d & d/yr	24/340	24/340
ROM moisture (est)	%	5	5
Primary U/G Crusher			
Primary U/G crusher	h/d	10	10
Crusher type		Jaw	Jaw
Feed top size	in x in x in	12 x 12 x 18	12 x 12 x 18
Product size	80% pass, inches	4	4
Stockpile			
Stockpile feed	h/d	10	10
Capacity	t	2 x 8,500	2 x 8,500
Secondary/Tertiary Crusher			
Secondary/tertiary crusher	h/d	24	24
Availability	%	80	80
Crusher type		Cone	Cone
Sec crusher product	80% pass, inches	1.0	1.0
Tertiary crusher product	80% pass, inches	0.375	0.375
Circuit configuration	-	Closed	Closed
Classification	-	Vibrating Screen	Vibrating Screen
Drying			
Drier feed moisture	%	5	5
Drier product moisture	%	1	1
Drier type	-	Horizontal Rotary Kiln	Horizontal Rotary Kiln
Grinding Circuit			
Grinding circuit	h/d	24	24
Availability	%	90	90
Feed size	80% pass, inches	0.375	0.375
Product size	80% pass, µm	150	150
Work index	kWh/ton	18	18
Circuit configuration	-	closed	Closed
Classification	-	Dynamic Separator	Dynamic Separator
Ceramics Plant			
Plant operation	h/d	24	24
Plant availability	%	90	90
Process	type	High temperature vacuum extrusion	High temperature Vacuum extrusion
Process LOI	%	8	8
Ceramics production	ft^2/yr	160,754,000	321,507,000

The process design criteria for the Ceramext™ process are proprietary and confidential and have not been released to AMEC. As such, AMEC cannot confirm if the design criteria are achievable or appropriate for the process. Dr. Carl Frahme, an independent consultant and the Qualified Person for the ceramic portion of the project, has evaluated the design criteria for the entire production-scale Ceramext™-based system. He has concluded that these criteria are achievable and present mostly straightforward, solvable engineering challenges. He also has concluded that the fundamental science and technology underlying this novel process is sound and that the technology of continuous hot extrusion of ceramic materials has been validated and demonstrated by the pilot plant testwork.

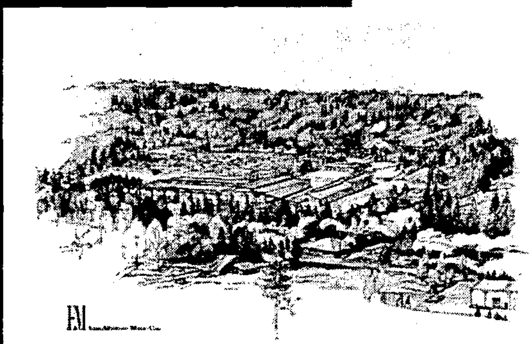
16.5 Equipment List

The process equipment list for the crushing, grinding, and ceramics manufacture is presented in Appendix E.

PRELIMINARY ASSESSMENT
TECHNICAL REPORT

Idaho-Maryland Mining Corporation

SECTION 17



Mineral Resource and Mineral Reserve Estimates

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17.0 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

The mineral resources for the Idaho-Maryland property were estimated under the direction of Idaho-Maryland Qualified Persons Mr. Mark Payne (gold resource) and Mr. Robert Pease (industrial mineral resource). Both are professional geologists registered in the State of California. The gold mineral resource has only experienced a slight increase from what was reported in the 2002 Technical Report (Juras, 2002). All mineral resources were estimated using traditional longitudinal sections and 3-D geologic models by commercial mine planning software (MineSight®). New to the Idaho-Maryland Project is a declaration of an industrial mineral resource for the ceramics feedstock.

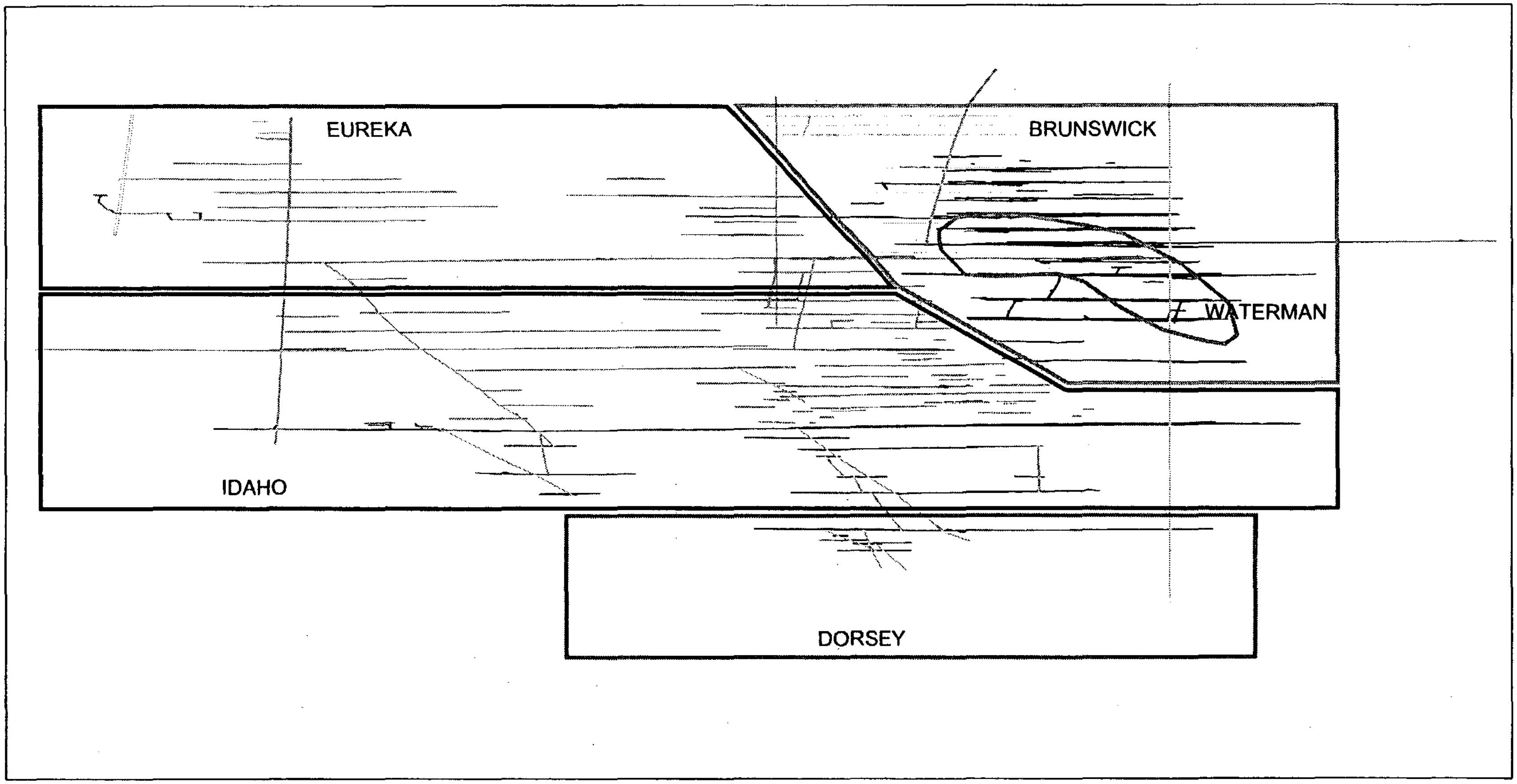
17.1 Idaho-Maryland Gold Mineral Resource

Gold mineralization at the Idaho-Maryland property resides in 11 discrete vein sets hosting at least four types of mineralization (see descriptions in Sections 7, 8, and 9). The mineralization was organized into five groups for resource estimation: Eureka, Idaho, Dorsey, Brunswick, and Waterman, (see Figure 17-1).

A review of historic data was conducted to outline areas of remaining gold mineralization, and a structural geological analysis was conducted to assign a particular mineralization type to a structure and/or vein. Only data that could be reconciled to a geologically consistent interpretation was included in the resource estimate. About 20% of the data identified as remaining and undeveloped was excluded because it was not supported by a coherent interpretation. AMEC believes this approach is consistent with best practice guidelines in resource estimation.

AMEC examined numerous areas of potential resource-bearing material, which generally fell into two categories: those based on underground development information, and those based on diamond drill hole intercepts (historic and 2003/2004). Evidence for the pertinent vein/structural interpretation was examined for data support and consistency. All examples based on the underground data demonstrated good data back-up and sound projection limits. Mineralization types were not mixed, and if multiple types occurred in proximity to each other, each was modeled separately. The interpretations based on the drill hole intercepts were also sound and reasonably projected. Historic data were hampered by the uncertainty in spatial location of the drill hole intercept, as they were not down-hole surveyed. In addition, most drill hole areas are defined by widely spaced data (200 ft and greater), thus all resources based on single drill hole intercepts were classified as "inferred" resources.

Figure 17-1: Idaho-Maryland Project Gold Resource Summary, 5 November 2004



AMEC checked the thickness calculations of numerous mineralized intervals and found the logic and geometric calculations applied to be correct. Because of the variable dips that occur in a structure and among mineralization types, Idaho-Maryland is also encouraged to express future work in horizontal or vertical thicknesses. This enables mineralized regions to be easily compared and provides a basis for mine planning work.

17.1.1 Structural and Mineralization Continuity

Continuity of geology and mineralization is a key component in a resource estimate, although it is usually based on data configuration and density in undeveloped properties. Past production data of the Idaho-Maryland Mine allow a more exact analysis to be undertaken, based on transcribing stope outlines from mined areas in various vein and structural zones to longitudinal sections.

This type of analysis was done by JAA for their 1991 *Technical Assessment Study* (see Section 3). AMEC reviewed their findings and concurs with the method employed and the results obtained. The JAA analysis confirmed that the Idaho-Maryland vein systems demonstrate high horizontal and vertical structural/vein continuity, with horizontal lengths ranging from 150 ft to 1,690 ft to a maximum of 5,600 ft, and averaging 885 ft for the vein systems reviewed. JAA also assessed vertical geologic continuity by examining the mined areas between levels 3280 and 580. Vertical extent ranged from 100 ft to 2,700 ft, averaging 615 ft.

To assess gold mineralization distribution, JAA investigated the presence of a mineralized and non-mineralized vein or structural material (defined at a threshold of 0.07 oz/ton Au) along a horizontal or vertical stope length. The assumption was that a stope defined a mineralized entity that was extracted as "ore." No further selection was done to optimize grade during extraction. The JAA analysis revealed that in any given stope, about 45% of the length contains mineralization above the threshold value. The remainder would represent internal dilution.

17.1.2 Data Analysis

Assay plan maps were inspected to review the gold data. Additionally, four sets of underground sample data taken from four different vein systems (the Idaho No.1, Idaho No.2, Dorsey veins (60 winze area) and Brunswick veins (1948 sampling)) were statistically analyzed. The mineralization systematically contained high to very high-grade pods along a horizontal or vertical length. Previous reviews by JAA and Drummond (1996) concluded that a high nugget effect is present, and an evaluation of the high-grade distribution can only be done on data from extensive underground sampling.

AMEC analyzed the data sets for the 2002 Technical Report on the same project. Results will not be repeated in this report. With respect to extreme grades, the distributions generally indicated unique high-grade discontinuity patterns. The trends defined in cumulative probability plots begin to become discontinuous around the 98^{th} to 99^{th} percentile levels. If a cap grade was to be chosen based on these results, it would vary by vein system. Past mineral resource estimates used arbitrary cap values of 1 oz/ton Au, which is too low for the Idaho-Maryland gold mineralization. AMEC continues to recommend that Idaho-Maryland conduct a more detailed statistical review of the underground data. The review, by vein system and mineralization type, would allow appropriate gold capping levels to be selected. Until such an analysis is undertaken, the resource estimates should be reported using uncapped grades. Exposure to extreme grades was evaluated by resource block and dealt with through classification.

Bulk density was assigned a tonnage factor of 12 for all stopes, resources and historic production. AMEC believes that this value is generally suitable for global usage. However, AMEC believes that locally the bulk density is too low, particularly around the Brunswick veins where scheelite is a ubiquitous component and for diabase hosted mineralization in the Idaho systems.

17.1.3 Mine Call Factor

Historically the planned mill feed tonnage and gold grade rarely matched the actual results. This was a result of a variety of factors that could be resolved by adjusting the planned production by a constant number. This number or factor is called the multiplier factor or mine call factor. Commonly, these deposit types typically under-predict the gold produced. Causes include poor sampling of high-grade material, inconsistent assaying procedures for the high-grade samples and, in places, the use of too low a bulk density number.

JAA conducted a detailed investigation into historic mine-mill reconciliation at the Idaho-Maryland. JAA selected data from later years (1950 to 1952), where the records of mine and mill production were kept in some detail and were traceable to parts of the mine. Two factors were calculated: a "model" (underground sampling) to "mine" (muck car sampling) factor, equal to 1.21, and a "mine" to "mill" factor, calculated to be 1.19. The total Mine Call Factor is equal to 1.44. AMEC reviewed the work done by JAA and agrees with their results. The use of the Mine Call Factor can be used to establish a relationship between the historic underground channel samples and expected production. This factor should only be used on the vein system data. The more homogeneous slate hosted mineralization should not be factored at any resource category. Nor should the factor be applied to any results from the 2003-2004 drill campaigns.

17.1.4 Resource Estimation

Estimation of grade and tonnage consisted of two processes: one based on underground samples (channel samples) and adjacent drill hole data (if present) and the other solely using drill hole data.

Resource Blocks – Underground Samples and Adjacent Drill Holes

The process for underground sample based resource blocks included drawing the hosting vein or structure in longitudinal section, averaging the underground sample assays along the vein or structure, and calculating a true thickness for the resource block (map data and trigonometric solutions using interpreted vein or structure morphology). Underground samples commonly included a vein assay, footwall, and less commonly a hanging wall assay for each face. These were combined into width x assay "composites" (utilizing a minimum 3 foot total width), summed, and the total divided by the sum of all sample widths. This produced a weighted grade for the resource block. Low-grade zones constrained the strike extent for many of these blocks. Dip projections depended on where the remaining material lay (e.g., below the level) and were drawn honoring the interpreted geological shapes. Measurements of the shapes in longitudinal section gave the block areas, which, together with the average true thickness, determined the volumes. Mined areas were outlined from stope plans and sections, and subtracted where applicable from the resource estimate.

AMEC checked numerous underground resource blocks for compatibility with the local, interpreted vein or structural geology, correct tabulation of underground sample values, reasonable projection limits and volumetric and trigonometric calculations. The checked blocks were properly constructed and calculated.

Brunswick No. 4 and No. 16 blocks comprise resources outlined in quartz stockwork areas and black slate bodies. They are characterized by widespread lower grade gold mineralization, especially the stockwork bodies. They contain numerous development headings (drifts, raises, minor crosscuts) and stoped areas. Assay data comprise underground channel samples (drifts and raises) and stope muck samples. Distribution of the gold values is more uniform than in the traditional vein systems but of lower grade and limited nugget-like values (i.e. defined as greater than 1 oz/ton Au). Grade estimation for these blocks consisted of global weighted averages.

Resource Blocks – Drill Holes Only

Drill hole based blocks mostly consist of single intercepts defining the respective grade and thickness values. Block areas are defined by a box outline, conforming to the interpreted morphology. The size of the outline is governed by the protocol established for the resource classification and historic stope lengths. Grades are calculated by summing interval length x gold value "composites," and dividing the total by the full interval length. The interval length was then calculated to the vein's true width. A minimum true width equal to 3 ft was used.

Blocks defined by multiple drill holes and/or samples from a nearby underground working follow a similar process for grade and thickness estimates. The area outline for these resource blocks are governed by projection within the plane of the vein or structure. Limits were set according to the classification protocol described below.

AMEC reviewed all resource blocks that were based on drill hole data because these blocks defined the majority of total tons and gold ounces at Idaho-Maryland. Grades and thicknesses were properly assigned. Outlines around drill hole intercepts were adjusted to revised distances described below. The revision adjusted the strike projection towards the intercept to prevent the over extrapolation of grade (drill hole data alone does not have the effect of low grade dilution included in similar systems using underground samples and adjacent drill holes).

17.1.5 Resource Classification and Summary

The mineral resource classification of the Idaho-Maryland gold mineralization used logic consistent with the CIM definitions referred to in National Instrument 43-101. Measured mineral resources are supported only in areas exposed by underground development and estimated from detailed underground sampling. The projection volume from a mined opening was up to 50 ft along the plunge or rake direction of the mineralized zone. In the case of resource block Brunswick No. 4, the entire volume was deemed to meet the definition of measured resources because of the numerous penetrations by drifts and sub-drifts, stopes, raises and lesser crosscuts more or less uniformly throughout the mineralized body.

Indicated mineral resource category is used to classify mineralization that surrounds measured mineral resources around underground openings and around drill intercepts within resource blocks that contain multiple drill holes and evidence of the hosting vein or structure in a nearby underground working within 200 ft. The projection volume was up to +100 ft. Also, this category included blocks that would have been classified as Measured mineral resources but demonstrate a degree of uncertainty in the grade estimate due to the presence of numerous plus 1 oz/ton Au assayed samples. These blocks will remain in the indicated resource category until such time that a proper investigation is carried out on setting appropriate grade capping levels at Idaho-Maryland.

The majority of the Idaho-Maryland mineral resource is classified as Inferred Mineral Resources. This includes all resources outlined by single drill hole intercepts. Here the projection was up to 100 ft along the strike and up to 200 ft up or down the plunge or rake. Around underground workings, the projection was limited to 200 ft from the working.

The gold mineralization of the Idaho-Maryland project as of 20 September 2004 is classified as Measured, Indicated and Inferred Mineral Resources. The classified mineral resources are shown in Table 17-1. The Idaho-Maryland gold mineral resource was reported at a 0.10 oz/ton Au cutoff grade. All estimated resource blocks equal to or greater than 0.10 oz/ton Au were tabulated in the summary.

Table 17-1: Idaho-Maryland Project Gold Mineral Resource Summary, 20 September 2004

	True Thickness (ft)	Tonnage (tons)	Gold Grade (oz/ton)	Gold (oz)	Gold Grade (oz/ton) 1.44 MCF	Gold (oz) 1.44 MCF[1]
Eureka Group [2]						
Measured Mineral Resource	6.5	17,000	0.18	3,000	0.29	5,000
Indicated Mineral Resource	5.7	41,000	0.27	11,000	0.37	15,000
Measured + Indicated Mineral Resources	**5.9**	**58,000**	**0.24**	**14,000**	**0.34**	**20,000**
Inferred Mineral Resources A	9.0	393,000	0.21	81,000	0.30	117,000
Inferred Mineral Resources B	4.8	49,000	0.37	18,000	-	-
Idaho Group						
Measured Mineral Resource	17.5	129,000	0.24	31,000	0.34	44,000
Indicated Mineral Resource	10.6	209,000	0.42	88,000	0.60	125,000
Measured + Indicated Mineral Resources	**13.3**	**338,000**	**0.35**	**119,000**	**0.50**	**169,000**
Inferred Mineral Resources	10.0	838,000	0.25	212,000	0.37	307,000
Dorsey Group						
Measured Mineral Resource	11.6	61,000	0.23	14,000	0.33	20,000
Indicated Mineral Resource	6.4	131,000	0.33	43,000	0.46	60,000
Measured + Indicated Mineral Resources	**8.0**	**192,000**	**0.30**	**57,000**	**0.42**	**80,000**
Inferred Mineral Resources	9.5	955,000	0.30	288,000	0.43	413,000
Brunswick Group						
Measured Mineral Resource	8.0	64,000	0.17	11,000	0.25	16,000
Indicated Mineral Resource	6.2	108,000	0.28	30,000	0.40	43,000
Measured + Indicated Mineral Resources	**6.9**	**172,000**	**0.24**	**41,000**	**0.34**	**59,000**
Inferred Mineral Resources	7.3	291,000	0.23	67,000	0.33	97,000
Waterman Group						
Measured Mineral Resource	70.7	831,000	0.15	127,000	-	-
Indicated Mineral Resource	30.5	75,000	0.21	16,000	-	-
Measured + Indicated Mineral Resources	**67.3**	**906,000**	**0.16**	**144,000**	**-**	**-**
Idaho-Maryland Project [3]						
Measured Mineral Resource 1	13.3	271,000	0.22	59,000	0.31	85,000
Measured Mineral Resource 2	70.7	831,000	0.15	127,000	0.15	127,000
Indicated Mineral Resource	8.1	489,000	0.35	172,000	0.50	243,000
Measured + Indicated Mineral Resources	**41.1**	**1,666,000**	**0.22**	**375,000**	**0.28**	**472,000**
Inferred Mineral Resources	9.3	2,526,000	0.26	666,000	0.38	952,000

1. MCF = Mine Call Factor (not applicable to Waterman Group resources). 2. Inferred resources are divided into **A** (historic data and mine call factor applied) and **B** (from 2003-2004 data and no mine call factor applied). 3. Idaho-Maryland measured resources are split into two categories: 1. the Eureka, Idaho, Dorsey, and Brunswick Groups, and 2. the Waterman Group (stockwork/slate type ore).

17.2 Idaho-Maryland Ceramics Industrial Mineral Resource

The mineral resource for the ceramics feedstock material comprised three components:

- demonstration of physical and chemical property homogeneity, i.e. mineral resource quality

- volume/tonnage estimate of material, (i.e., mineral resource quantity)
- marketability of the mineral resource.

Consideration of these components are necessary in order to classify an industrial mineral resource and are consistent with the guidelines for the reporting of industrial minerals in the CIM definitions referred to in National Instrument 43-101.

The industrial mineral resource estimate for the ceramics feedstock material consists of units found in the large Brunswick Slab. Matters pertaining to resource marketability are discussed in Section 19.3.

Each resource estimate is discussed separately below.

17.2.1 Mineral Resource Quality

Andesitic volcanic units and diabase intrusive units (collectively form the main ceramics feedstock material) are present as near continuous material in the western half of the Brunswick Slab. This is confirmed by surface mapping and surface diamond drilling.

Chemical properties of the potential ceramics feedstock material are discussed in Sections 9 and 16. Geochemically, the units show desirable SiO_2, Na_2O and CaO contents, as well as Na_2O:CaO ratios. Variations in these are minimal and demonstrate homogeneous characteristics in the main ceramics feedstock material. Successful ceramics extrusion tests were made on samples of this material (see Section 16). AMEC reviewed the results of key quality measurements used in assessing these resources and found that they gave consistent and favourable results for the Brunswick Slab andesite+diabase samples.

17.2.2 Resource Estimate and Classification

The ceramics feedstock material mineral resource as of 5 November 2004 is classified as Measured, Indicated, and Inferred mineral resources. The classified resources are shown in Table 17-2.

Table 17-2: Idaho-Maryland Project Ceramics Feedstock Mineral Resource Summary, 5 November 2004

Classifications	(Myd^3)
Measured Mineral Resource	48,817,000
Indicated Mineral Resource	122,685,000
Measured + Indicated mineral resources	171,502,000
Inferred Mineral Resource	358,112,000

Note: Bulk density value (tonnage factor) = 11.4 ft^3/ton.

The following definition of mineral resources is taken from the Canadian Institute of Mining (CIM) standards.

Inferred 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 from locations such as outcrops, trenches, pit, and drill holes.

Indicated Resource

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 reasonable assumed.

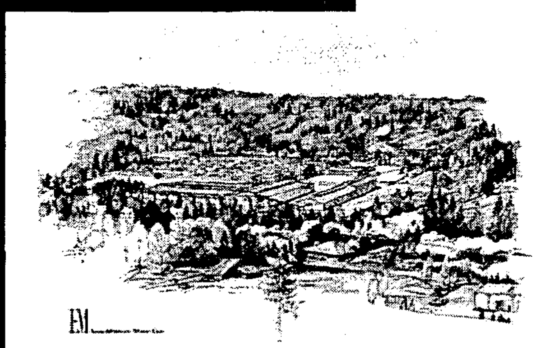
Measured Resource

A Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, 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.

No classification guidelines for Measured, Indicated, and Inferred exist for ceramics feedstock material. AMEC and Idaho-Maryland developed a protocol for the project that incorporated degrees of confidence in physical and chemical continuity. Criteria for Measured level of confidence required 2004 drilling coverage, surface outcrops, whole rock chemical analyses and successful extrusion tests on the main ceramics feedstock material. Data was allowed to extend up to 300 ft from a drill hole. Indicated status was conferred when ceramics feedstock material was observed at surface and up to 600 ft from 2004 drill holes. Inferred resources covered essentially the western half of the Brunswick Slab (eastern extent was set to approximately 1,000 ft past the last outcrop.

PRELIMINARY ASSESSMENT TECHNICAL REPORT

EMGOLD Idaho-Maryland Mining Corporation



SECTION 18

Other Relevant Data and Information

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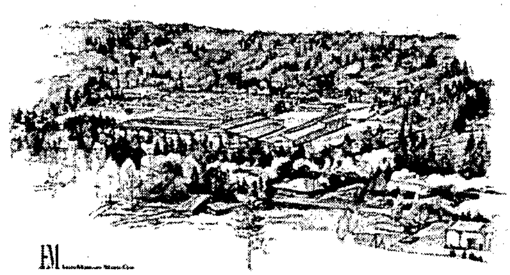
18.0 OTHER RELEVANT DATA AND INFORMATION

This section is not applicable to the Idaho-Maryland Mine project.

PRELIMINARY ASSESSMENT
TECHNICAL REPORT

EMGOLD Idaho-Maryland Mining Corporation

SECTION 19



Requirements for Technical Reports on Production and Development Properties

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19.0 REQUIREMENTS FOR TECHNICAL REPORTS ON PRODUCTION AND DEVELOPMENT PROPERTIES

19.1 Mine Plan

19.1.1 Introduction

Room-and-pillar stoping has been chosen as the long-term mining method for providing ceramic feed material as it is responsive to changes in ground conditions and the equipment and manpower required is similar to that for tunneling. It is a man-entry method; therefore, underground openings will be smaller than with other bulk mining methods.

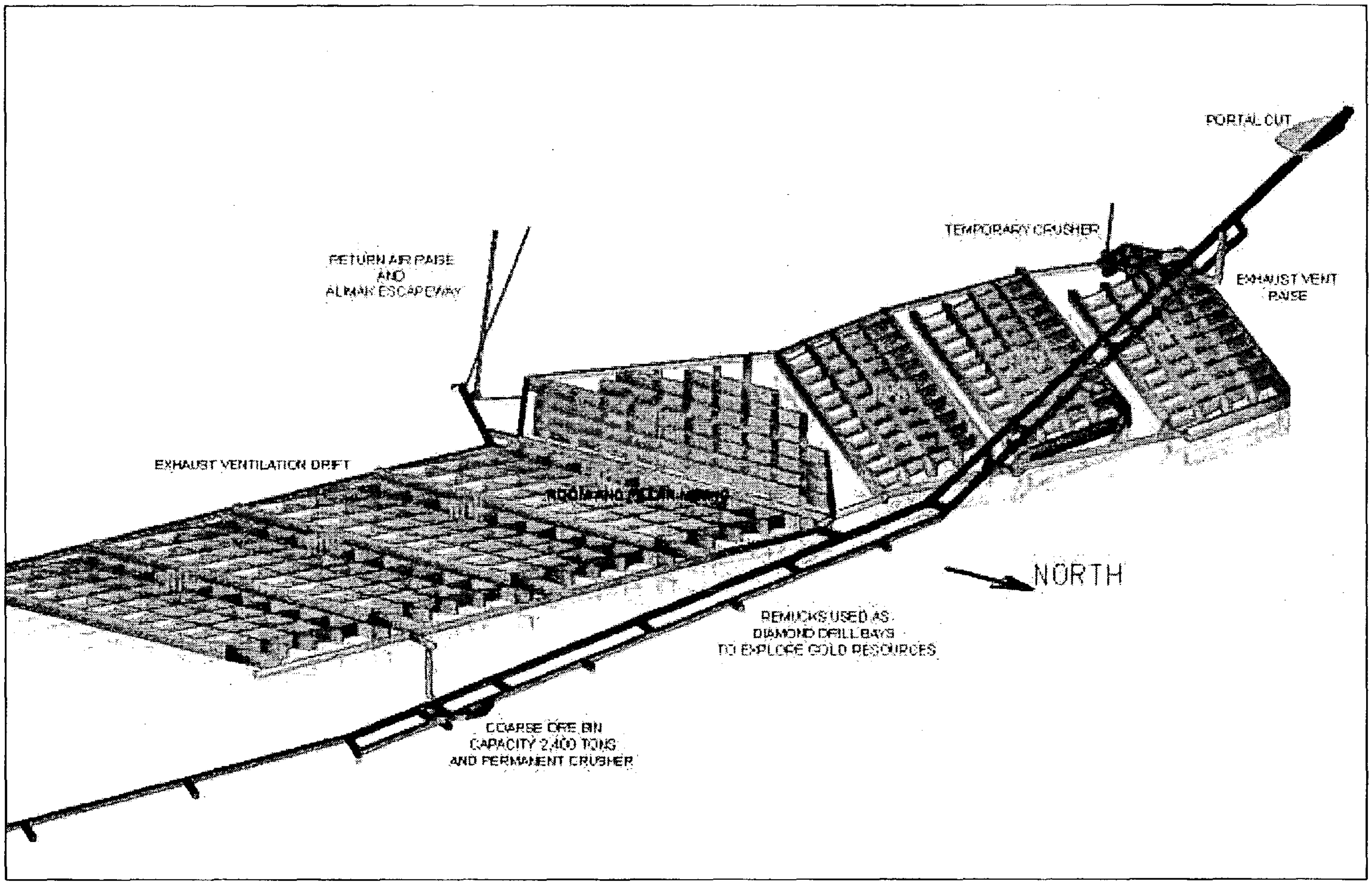
Figure 19-1 provides a general view of the mine access and the location of room-and-pillar stopes 500 ft below surface. No backfill is planned after extraction of the resource, and pillars have therefore been designed with very high safety factors. Mining extraction is planned at roughly 25% of the resource below 500 ft depth to preserve rock mass stability. Room-and-pillar mining for ceramic feed will start at 500 ft below surface, roughly three years after the start of the underground decline. By this time, the permanent crushing and conveying installation will be operational. Until the permanent crusher is installed, a temporary crusher will be moved from surface to a location underground 1,000 ft from the portal within a year of the start of the decline and will be used to supply surface stockpiles.

To ensure timely start-up and to cover the lead time for procuring mining equipment, initial mining will be done by a mining contractor. In Year 4, operation of the mine will be taken over by the owner. Specialty underground work such as raiseboring and driving Alimak raises will be done by contractor.

Rock excavated for the decline and accesses to production areas will be used as feed to the ceramics plant. The decline has been placed such that it can be used as a drill platform for exploration of the known gold resources of the historic Idaho and Brunswick mines.

Underground industrial minerals production is scheduled to ramp up gradually to 2,400 ton/d over the course of five years and could increase beyond this level in response to increased demand for ceramic feedstock.

Figure 19-1: Mine Access and Location of Room-and-Pillar Mining Looking Southwest



Ground conditions in the area of the ceramics feedstock resource are expected to be very good and major fractures or faults connecting the industrial minerals production areas with old mine workings are not expected. It is likely that only small amounts of water will have to be pumped out of the decline and that most of this can be treated and recycled for use underground. Dewatering of the old mine workings from the New Brunswick shaft will be required to eliminate the risk of transfer of water pressure through diamond drill holes penetrating areas close to the old workings. In addition, the decline will break through onto the Brunswick 1300 Level and the shaft must be dewatered to this level before a connection is made.

Table 19-1 presents the planned relative depths for infrastructure and mining. Parameters for mine design are listed in Table 19-2.

Table 19-1: Relative Depths and Elevations of Underground Infrastructure

	Elevation (ft)	Depth from Surface (ft)	
Surface at portal	2,505	-	-
Temporary crusher	2,355	150	1,000 ft from portal
Room-and-pillar mining	2,100	more than 500	-
Permanent crusher	1,930	885	-
Brunswick 1300 Level	1,450	1,365	-

Table 19-2: Parameters Used for Mine Design

Production Mining	Room-and-pillar stoping with slashing and benching
	Room size after benching 26 ft wide x 40 ft high
	Pillar size 65 x 65 x 40 ft high
	Minimum depth of mining from surface 500 ft
	Productivity 136 tons per manshift
Trucking	Truck to surface on day shift until temporary crusher is installed
Temporary Crusher	Operational underground within a year
Permanent Crusher	Installed 3.5 years after start of portal
	Crush and convey to surface during day shift
Single Face Decline	From portal to temporary crusher
	24 ft wide x 19.7 ft high arched back. -15% gradient
	Advance rate 280 ft/mo
	Productivity 3.35 ft/manshift
Dual Face Decline	From end of single face decline to Brunswick 1300 Level
	18 ft wide x 19.7 ft high arched back. -15% gradient
	Advance rate 530 ft/mo 14.5 ft rounds drilled, 13 ft broken

	Remuck every 500 ft
	Requires 2.3 ft of face and remucks advance for every foot of decline
	Productivity 3.35 ft/manshift
	Shotcrete requirement estimated at 2.5% of total advance
Blasting	Restricted blasting times during initial start-up due to the close proximity to surface
Days worked	7 d/wk underground
Shifts	2 x 10 h shifts
Days per Year	350
Attendance factor	84.7% for 10 hour shifts 350 d/yrr
Labor Utilization	81% of time spent on tasks that are directly productive
Explosives	85% ANFO, 15% Emulsion
In situ Density	11.4 ft^3/ton
Contractor Costs	15% profit. $150,000 each for Mobilization & Demobilization of Equipment
Drifting, Decline and Ancillary Development	
Direct Labor: Miners, Mechanics, Electricians	$337 /ft
Operating Supplies, Explosives, Ground Support	$249 /ft
Mobile Equipment Operating Costs	$339 /ft
Services, Power	$318 /ft
Contractor Mob, Demob + Profit	$149 /ft
	$1,393 /ft
Room-and-pillar Drifting, Slash, Bench	
Direct Labor: Miners, Mechanics, Electricians	$10.18 /ton
Operating Supplies, Explosives, Ground Support	$11.56 /ton
Mobile Equipment Operating Costs	$3.71 /ton
Services, Power	$4.17 /ton
	$29.62 /ton

19.1.2 Mine Mobile Equipment

Acquisition of underground mobile equipment is summarized in Table 19-3. Two boom jumbos with computerized controls have been selected because this equipment can assist in optimization of drill hole patterns leading to a reduction of explosive costs.

Table 19-3: Mobile Equipment Acquisition Schedule

Underground	Cost per	Pre - Production		Expansion				Full Production					
Mobile Equipment	Equipment	Year 1	Year 2 Q1 + Q2	Year 2 Q3 + Q4	Year 3	Year 4	Year 5 Q1 + Q2	Year 5 Q3 + Q4	Year 6	Year 7	Year 8	Year 9	Year 10
Cat 730 Trucks	641,333	3.0	-	1.0	3.0	1.0	-	-	1.0	1.0	1.0	-	-
Trucks like MT 5010	959,790	-	-	-	-	-	-	-	-	-	-	-	-
Jumbo 2 Boom with computerized control	816,270	1.0	-	1.0	1.0	0.5	-	-	0.5	-	1.0	-	1.0
Bolter like Boltec 235, or Robolt 06	702,000	-	1.0	-	-	-	0.5	-	-	-	-	1.0	-
Bolter Like MacLean 946	546,000	1.0	-	1.0	-	-	-	-	-	1.0	-	-	-
Scissor Deck	210,000	1.0	1.0	-	-	-	-	-	2.0	-	-	-	2.0
Wheel Loader Cat 966 (New)	365,000	1.0	1.0	-	-	-	-	-	-	-	-	-	-
Blasting Truck	365,000	1.0	-	-	-	0.5	-	-	-	1.0	-	-	0.5
LHD like ST 15-10 or Toro 1400	780,000	1.0	-	1.0	1.0	-	-	0.5	-	0.5	1.0	-	1.0
Service Vehicles	60,000	1.0	1.0	-	-	-	1.0	-	1.0	-	-	1.0	1.0
Grader	250,000	1.0	-	-	-	-	-	-	1.0	-	-	-	-
HIAB	60,000	1.0	-	-	1.0	-	-	-	-	-	1.0	-	-
Shotcrete Machine	40,000	2.0	-	-	-	-	-	-	-	-	2.0	-	-
Portable Compressors	4,000	3.0	2.0	-	1.0	-	-	-	3.0	2.0	1.0	-	3.0
Jacklegs	4,000	5.0	-	-	-	5.0	-	-	-	5.0	-	-	2.0
Stopers	4,000	2.0	-	-	-	5.0	-	-	-	5.0	-	-	2.0
Fan 150hp	17,000	1.0	-	-	1.0	-	-	-	-	-	-	-	-
Fan 75hp booster	8,000	1.0	1.0	-	1.0	-	1.0	-	1.0	1.0	1.0	1.0	1.0
Flygt Pumps	8,000	2.0	-	3.0	-	-	-	2.0	3.0	-	-	2.0	3.0
Flygt Pumps	1,000	-	-	3.0	-	-	-	-	3.0	-	-	-	-
Pick-up Truck (surface)	40,000	3.0	-	-	-	3.0	-	-	-	3.0	-	-	3.0
Van (surface)	40,000	1.0	-	-	-	1.0	-	-	-	1.0	-	-	1.0
Total[1]		$6,951	$1,651	$3,425	$4,403	$1,747	$511	$495	$2,225	$2,633	$2,915	$959	$3,024

[1] includes insurance, freight, and spare parts

Some surface-type equipment has been selected because the heading size is adequate and because delivery times for new underground equipment may exceed 10 months. Depending on the contractor selected to do the work, this may not be an issue, as the contractor may have their own equipment.

Advantages of using surface-type equipment are:

- lower capital costs
- ready supply of parts and service
- much shorter lead times for purchasing equipment.

Disadvantages are:

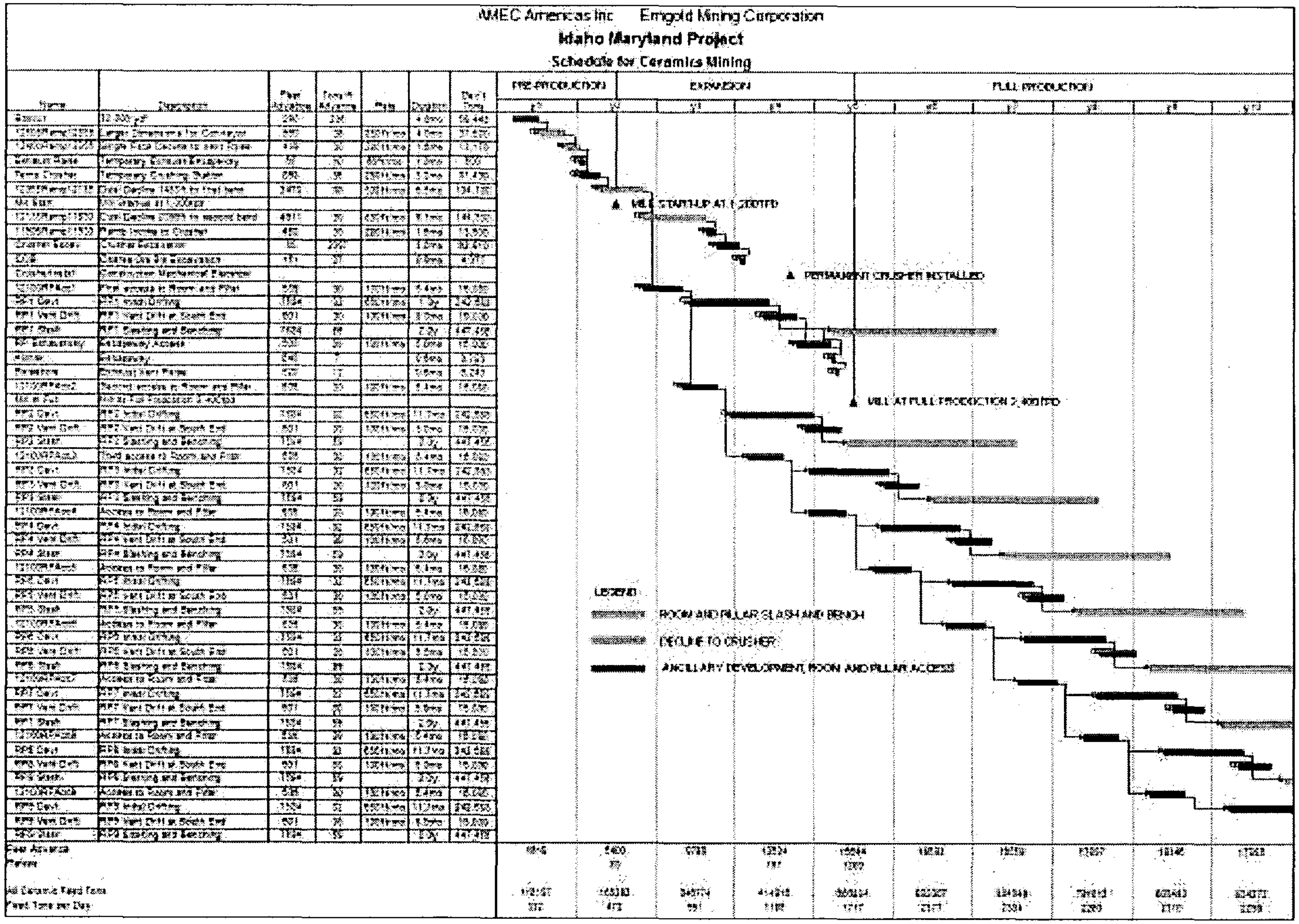
- greater height and width requirements
- surface equipment is not designed with heavy chassis for use in an underground environment
- wheel loaders are not designed for backing 500 ft up a 15% decline with a full bucket
- operator sits facing forward and must rely on mirrors for backing up.

19.1.3 Project Schedule

Figure 19-2 shows the schedule for ceramics production. The decline connection to the Brunswick 1300 level is not shown on this schedule as this portion of the ramp is located outside the inferred resource and cannot be included with the ceramic feedstock. It has therefore been treated as capital development in waste.

Refer also to Figure 19-14 shown in Section 19.1.4, which shows the schedule for gold exploration, decline breakthrough to the Brunswick Mine and shaft dewatering.

Figure 19-2: Project Schedule Underground Development



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19.1.4 Ground Conditions

Results from core drilling completed in 2004 have been compiled with geological mapping of surface exposures and underground mapping information. From this data, it appears that room-and-pillar stopes can be placed in rock that is roughly 70% meta-andesite, 17% meta-diabase, and 9% meta-gabbro.

Although weaker rock will be avoided, there are occasional fracture zones with gouge. It is estimated that these zones are spaced in excess of 230 ft apart.

Figure 19-3 summarizes rock quality designations for holes drilled from surface in 2004 in the area close to the planned portal. Rock quality information for weathered rock close to surface and to a hole depth of 150 ft has been excluded. It is estimated that the decline and the voids created by bulk mining can be located in ground with RQDs exceeding 85%. Figure 19-4 is a picture of drill core in rock similar to that in which the decline will be placed.

Figure 19-3: RQD Results from Seven Holes, 2,500 ft of Drilling (excludes all data from surface to 150 ft depth)

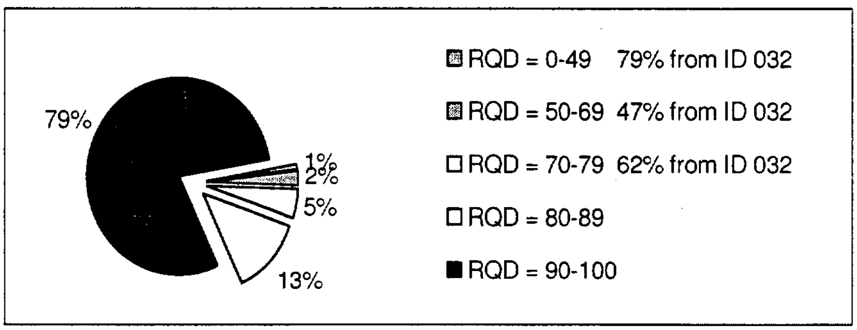


Figure 19-4: Core Sample Typical of Andesite

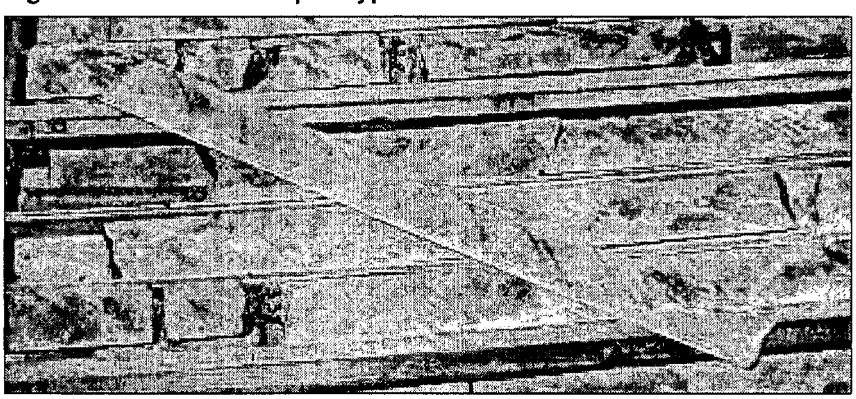


Table 19-4 shows a range of rock quality values for preliminary calculations of stope dimensions. Based on these numbers, large openings would be stable if they can be positioned at a favorable angle to structure and away from major faults. It is expected that the occasional fracture zone with gouge will be encountered. The fracture zones will be mapped at the time stope accesses are driven and would likely determine the most favorable orientation of underground openings.

Table 19-4: Estimated Range of Rock Quality Values Expected for Mining in Andesite using Barton's Rock Tunneling Designation

		Block Size RQD / Jn		Inter-Block Shear Strength Jr / Ja		
	RMR	RQD	Jn	Jr	Ja	Q[1]
Upper Range	100	97	0.5	2	0.75	517
Lower Range	76	90	2.0	1.5	2	34

Figure 19-5 shows the results of 3-D boundary element stress modeling of the room-and-pillar mining at 500 ft depth using Map3D software. It has been assumed that vertical stresses will increase in the order of 4.3 psi/ft (0.03 MPa/m) of depth. As such, the pillars will experience greater vertical stress than horizontal stress. The strength factor of the pillars indicates a high factor of safety well in excess of five and the induced pillar core stresses are low 1,305 psi (9 MPa). **Error! Reference source not found.** shows how the width to height ratio of the pillar plots for a rock type with uniaxial compressive strength of 21,750 psi (150 Mpa) (andesite). This shows that the selected pillar design is well within the stable range compared to a selection of case studies.

The data is considered approximate but adequate for this level of study and no attempt has been made at optimization of the pillar design. The modeling indicates that for room-and-pillar mining on a single horizon, a 50% extraction factor of the ceramic feedstock resource is a reasonable approximation. If mining occurs on multiple horizons, a 40 ft thick sill pillar may be required between horizons. This would indicate an extraction factor of 25% of the overall resource if no backfill is used and if the openings must remain stable indefinitely.

Figure 19-5: Stress Fields Modeled

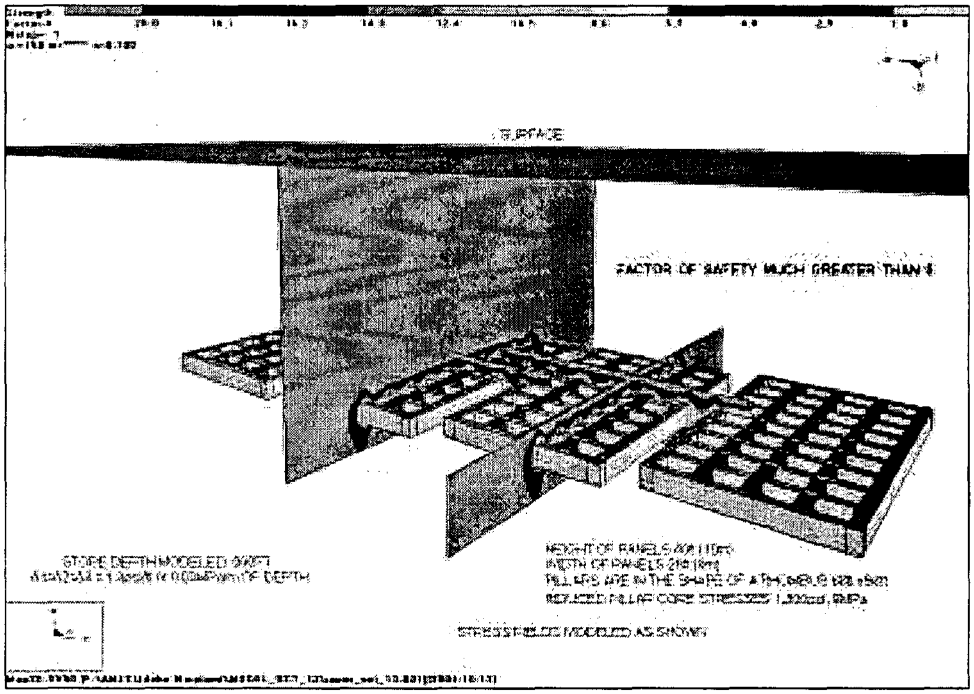
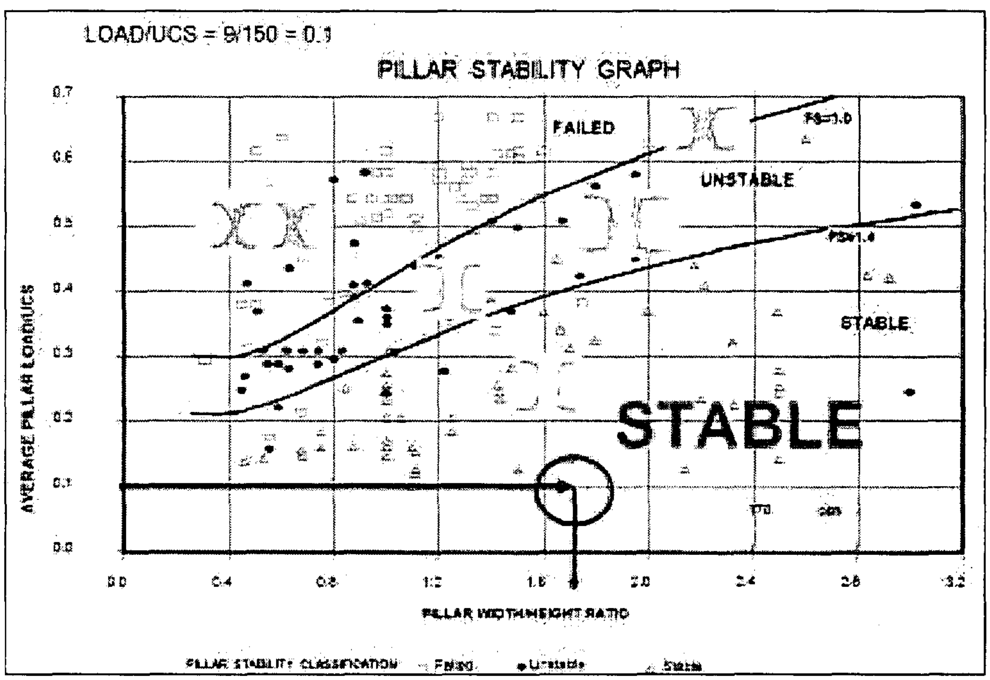


Figure 19-6: Pillar Stability



19.1.5 Mine Access

The volume of material in the portal cut is estimated at 32,000 yd^3 of loose to solid material. It should take less than six weeks to excavate the portal cut, assuming some blasting will be required. Once the cut has been excavated, a multi-plate culvert will be assembled and placed in concrete foundations. Engineered fill, packed in layers close to the culvert will help distribute stress as rock is placed above and around the culvert and surface contours restored. Five months has been allowed for this work and for the support of the first 100 ft of decline, which is expected to be driven in weathered rock.

Large heading sizes of 18 ft wide x 19.7 ft high have been chosen to provide feed to the mill and at the same time provide height for the initial surface-type mining equipment to be used. The decline will start as a single heading as it descends into the overburden and encounters a transition to competent rock. This transition from overburden to weathered rock to competent rock is expected to occur over the first 100 ft, and allowances have been made in the capital costs for additional ground support required in this section. A general view of an arrangement of openings at the start of the decline is shown in Figure 19-7, followed by a cross-section of the portal in Figure 19-8.

For environmental and noise considerations, a temporary crusher will be located underground approximately 1,000 ft from the portal, and the surface stockpiles will be fed via conveyor from this crusher on dayshift only. A small, dedicated raise will be required to ventilate the crusher area.

Once competent rock has been encountered, the decline will split into two 18 ft wide x 19.7 ft high parallel declines as illustrated in Figure 19-9.

The decline will advance as two faces separated by a 60 ft pillar. This will allow one decline to be used as a fresh air intake and the other for exhaust, thereby providing ample ventilation without the need for a major ventilation raise until a connection can be established with the New Brunswick mine workings.

It will be necessary to drive short connection drifts between declines in order to provide flow-through ventilation for workers close to the face of the decline. As the next cross-cut is broken through between the two declines, auxiliary fans can be moved up to the last open cross-cut, and a ventilation bulkhead can be built across the previous open cross-cut. With this ventilation scheme, multiple headings can be driven from the decline simultaneously. The declines will be driven in metavolcanic rock, which can be used for ceramic plant feed. The alignment and grade of the decline and its ancillary drifts will provide access to zones containing known gold resources and potential gold exploration targets.

Figure 19-7: Start of Decline

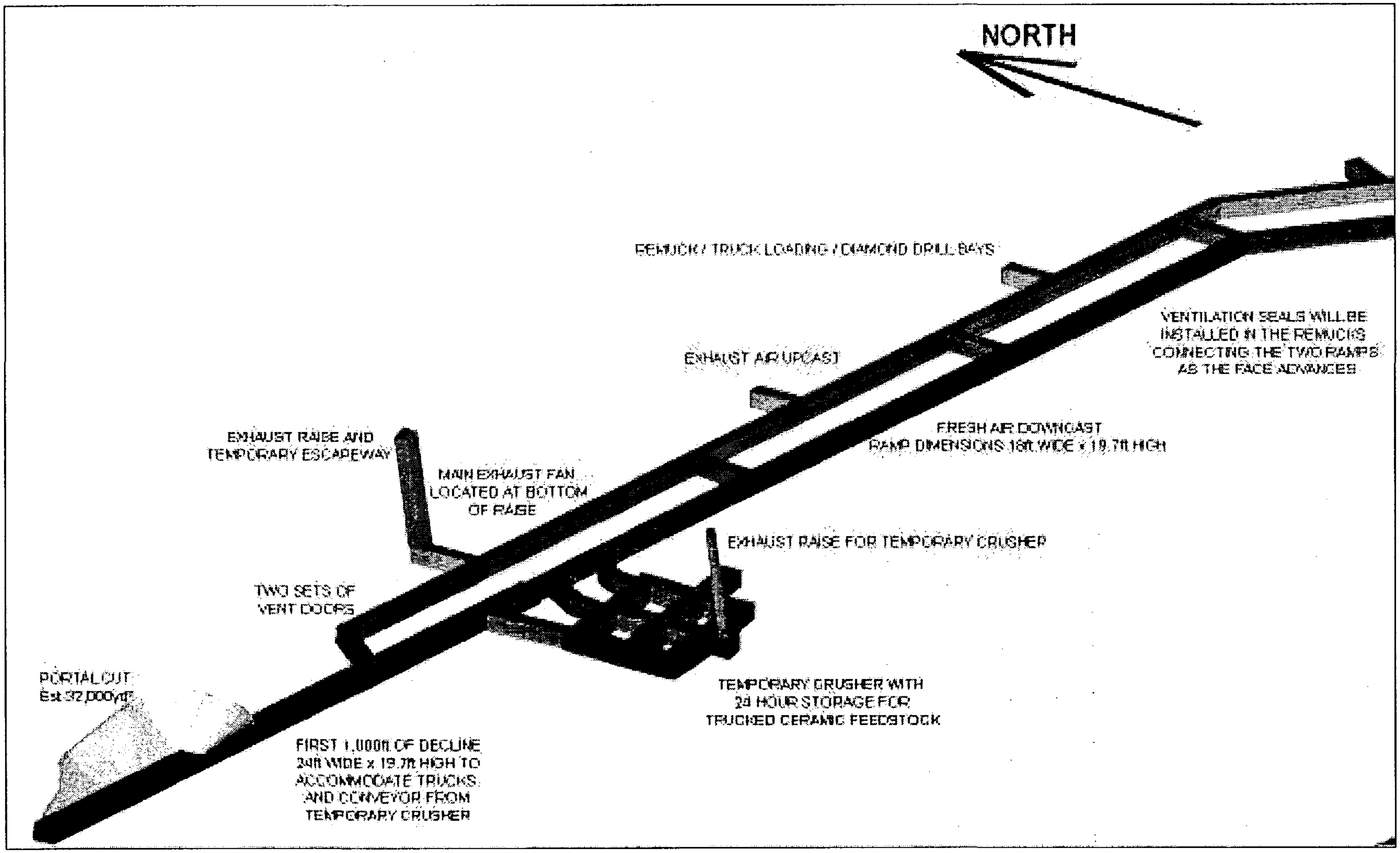


Figure 19-8: Cross Section of Portal

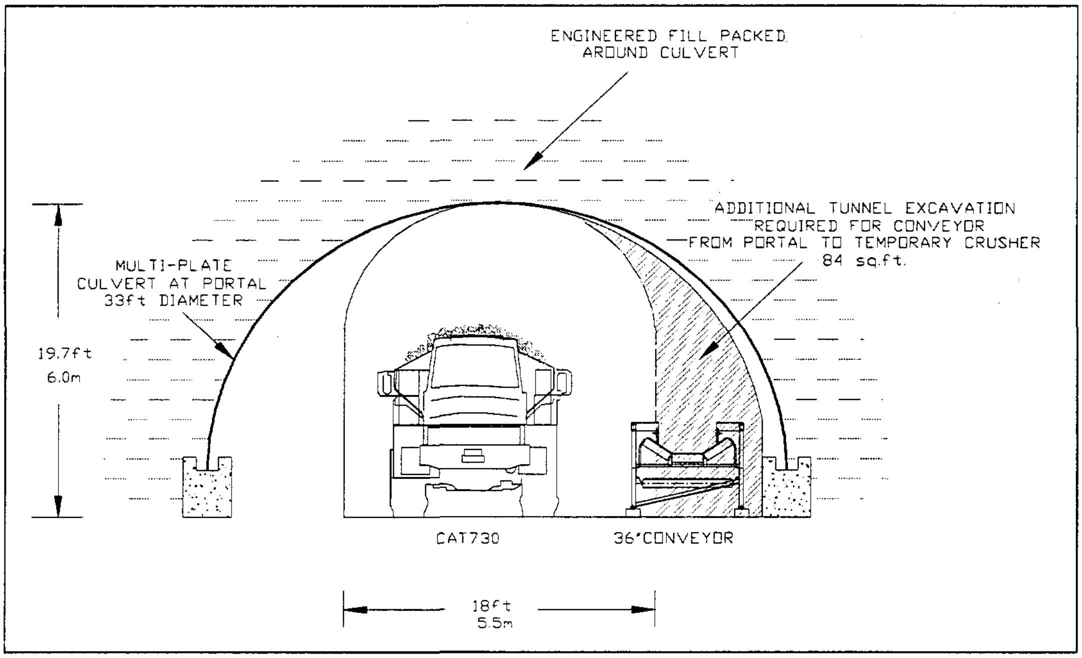
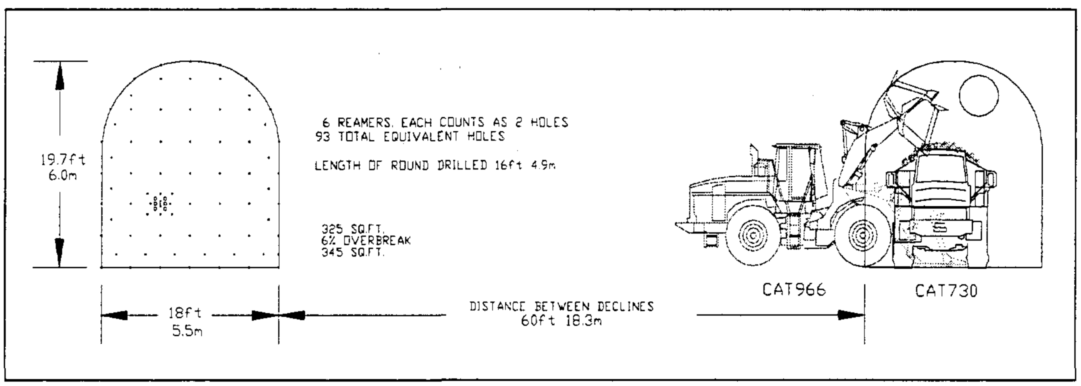


Figure 19-9: Dual Decline



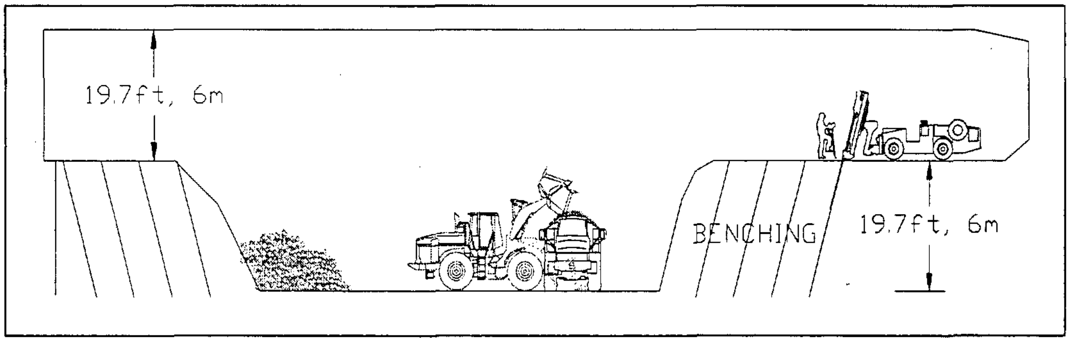
Muck bays will be cut on 500 ft intervals and, as mentioned above, cross-cuts will be driven to connect the two declines on 500 ft centers along the decline alignment (see Figure 19-7). These muck bays will serve to store muck for truck loading and can be used afterward for exploration drilling.

A twin decline system can provide for single-direction traffic flow for each decline, smoothing the flow of traffic and preventing oncoming traffic conflict typical of a single-heading scenario.

19.1.6 Mining of the Industrial Minerals (Ceramics Feedstock) Resource

The industrial minerals resource will be mined by room-and-pillar stoping and will commence as drifting with dimensions similar to the decline. This will be followed by slashing of the wall to 26 ft wide and benching to a depth of 40 ft as illustrated in Figure 19-10.

Figure 19-10: Room-and-Pillar Benching



It is assumed that it will be necessary to fix weld mesh to all or part of the roof to protect workers during the benching phase. Productivities during the slashing and benching phases will be much higher than during the initial drifting. The overall productivity of drifting slashing and benching has been estimated at 136 tons/manshift.

Figure 19-11 shows a general view of a preliminary layout for the room-and-pillar stoping area.

19.1.7 Exploration of the Gold Resource

The objective of the exploratory drilling program is to identify, define, and expand the gold resource. The currently identified gold resources are contained in numerous resource blocks identified from historic drill holes in the Idaho-Maryland Mine. Figure 19-12 shows gold resources identified from historical records that warrant further exploration and can be explored by diamond drilling as the decline reaches the Brunswick 1300 Level. The same figure also shows the proximity of the room-and-pillar stoping area and decline to the Idaho #1 Fault.

The decline can be continued below the 1300 Level as required or the New Brunswick Shaft can be enlarged and used as an internal shaft to service the lower elevations. This will permit access to additional gold resource blocks as shown in Figure 19-13.

Idaho-Maryland is developing an exploration budget that will be based on the results of surface exploration to be done in 2005 as well as the ongoing review of historical data.

Figure 19-11: General View of Ceramics Feedstock Resource Room-and-Pillar Stoping Area

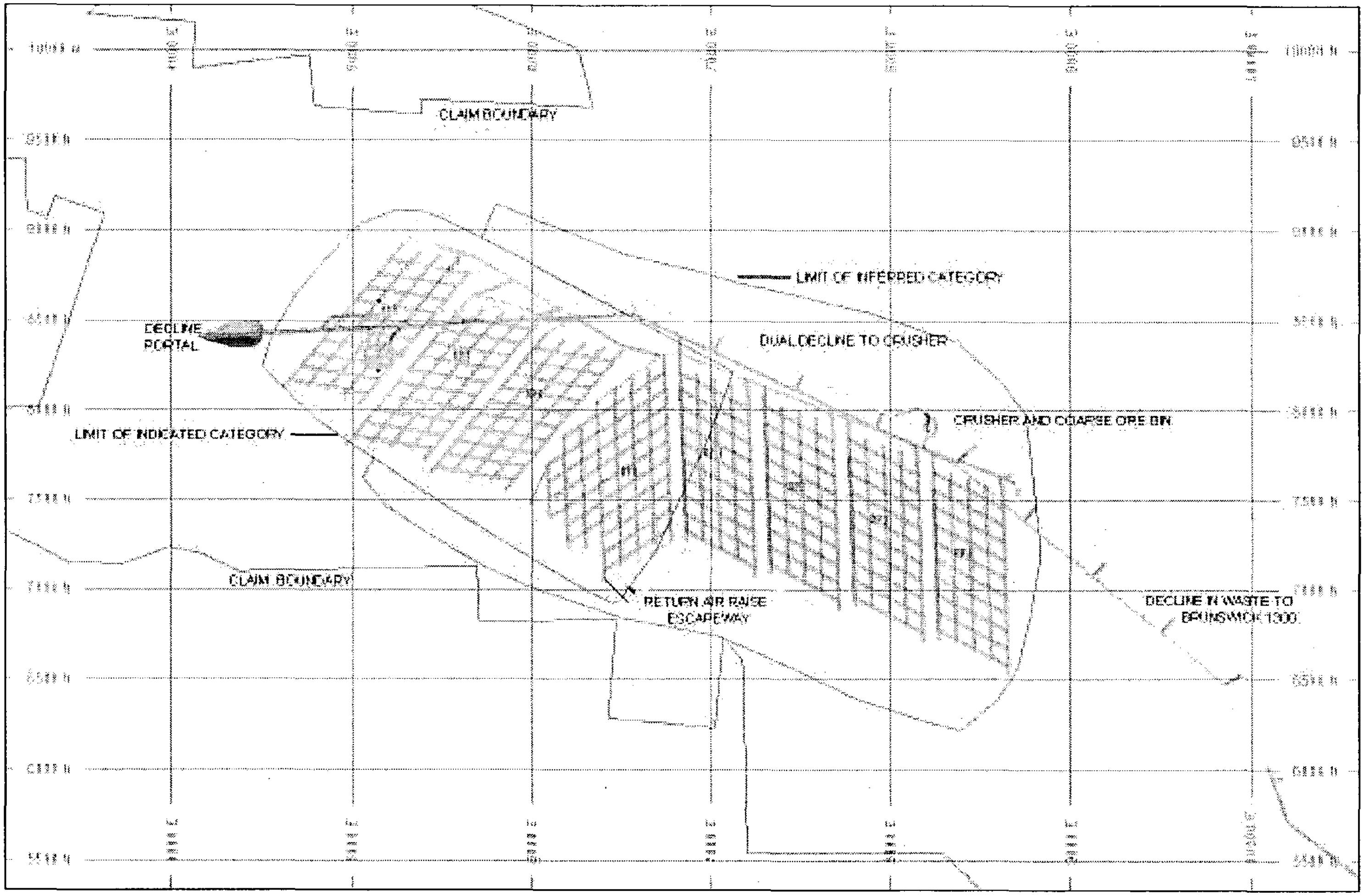
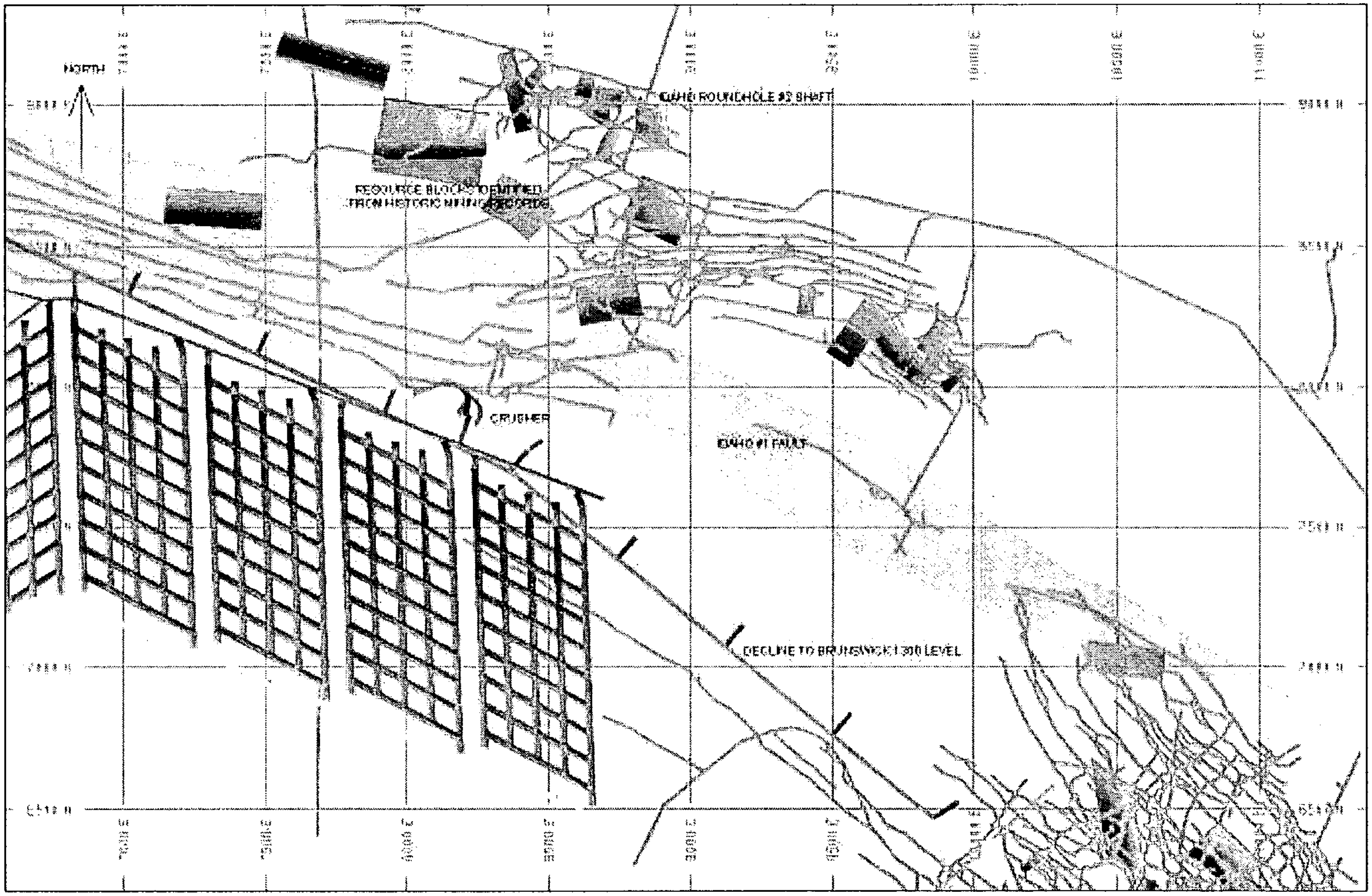
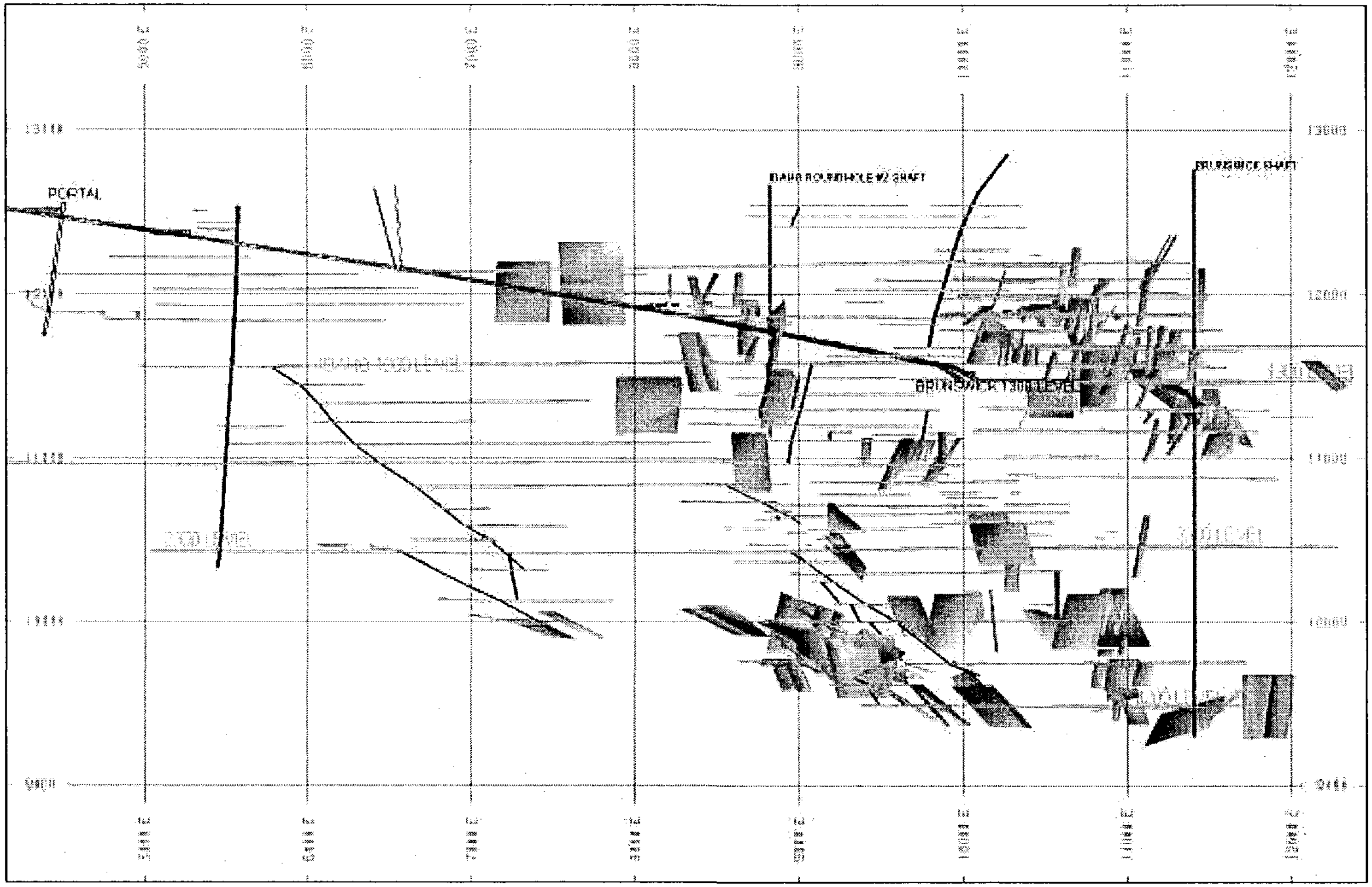


Figure 19-12: Gold Resource Blocks Identified from Previous Mining*



*Can be explored by diamond drilling from the decline as it approaches 1300 Level

Figure 19-13: View of Brunswick and Idaho Mine Levels Looking North showing Decline and Gold Resource Blocks Identified from Previous Mining



The schedules for gold exploration in the Idaho-Maryland Mine and from the decline are shown in Figure 19-14.

Table 19-5 shows a summary of expenditures based on this schedule until the end of Year 6, at which time there will be sufficient information to do a feasibility study for extraction of the gold resource.

Table 19-5: Cost Summary, Gold Exploration, and Shaft Rehabilitation

Brunswick Shaft and Surface Infrastructure	$4.0 M
Shaft and Level Rehabilitation	$12.6 M
Exploration Drifting, Drilling, Sampling, and Data Compilation	$25.4 M
Feasibility Study	$1.2 M
Total	$43.0 M

19.1.8 New Brunswick Shaft

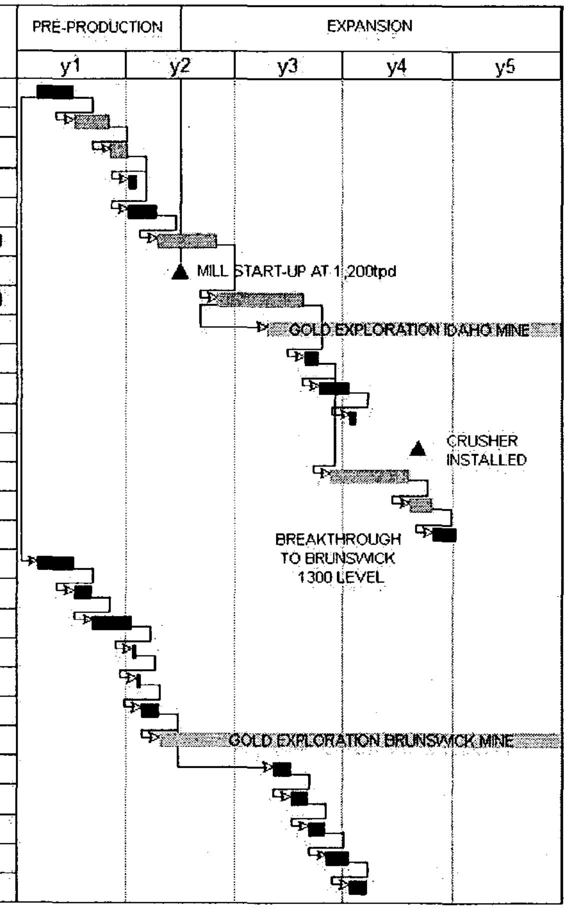
The New Brunswick Shaft is located in an area zoned as residential and light industrial. The shaft is not being considered for use as a main ore haulage route, as the shaft compartments are small (4 ft x 4 ft) and not conducive to efficient mining practices.

Below the static water level at 260 ft depth, inspection by remote underwater camera has shown shaft timbers to be in good condition.

Dewatering of the New Brunswick Shaft will be necessary in the event that the decline comes close, or breaks through into the old mine workings, and prior to the commencement of exploration drilling in the vicinity of the old workings. This will eliminate the danger of transferring hydrostatic pressure through diamond drill holes from flooded workings when drilling from the decline. Dewatering and rehabilitation of the New Brunswick Shaft will also allow earlier access for exploration drilling in the Brunswick area and ultimately into the Dorsey and other areas within the pre-existing Idaho-Maryland workings.

Figure 19-14: Schedule for New Brunswick Shaft and Gold Exploration

Name	Description	Feet Advance	Tons/ft Advance	Rate	Duration	Dev't Tons
Boxcut	32,000 yd³	290	236		4.0mo	68,440
12505Ramp12355	Larger Dimensions for Conveyor	990	38	250ft/mo	4.0mo	37,620
12400Ramp12355	Single Face Decline to Vent Raise	439	30	280ft/mo	1.6mo	13,170
Exhaust Raise	Temporary Exhaust/Escapeway	60	10	60ft/mo	1.0mo	600
Temp Crusher	Temporary Crushing Station	898	35	280ft/mo	3.2mo	31,430
12355Ramp12135	Dual Decline 1483ft to first bend	3470	30	530ft/mo	6.5mo	104,100
Mill Start	Mill Start-up at 1,200tpd					
12135Ramp11830	Dual Decline 2056ft to second bend	4811	30	530ft/mo	9.1mo	144,330
DDH on Ramp	Diamond Drill Program from Decline				2.6y	
11906Ramp11930	Ramp Incline to Crusher	450	30	280ft/mo	1.6mo	13,500
Crusher Excav	Crusher Excavation	30	2097		3.0mo	62,910
COB	Coarse Ore Bin Excavation	151	27		0.9mo	4,077
CrusherInstall	Construction Mechanical Electrical					
11830Ramp11540	Single Face Decline 1955ft to third bend	2288	30	280ft/mo	8.2mo	68,640
11540Ramp11450	Single Face Decline 607ft to BR1300 Level	710	30	280ft/mo	2.5mo	21,300
11450 BR1300	Along Brunswick 1300 Level to Shaft	990	38	450ft/mo	2.2mo	37,620
Bwk Hoist	Hoist House Construction				4.0mo	
Bwk Treatment	Water Treatment Construction				2.0mo	
Bwk Headframe	Headframe Construction, reinforce collar				4.0mo	
Bwk Shaft read	test and Commission Shaft				2.0w	
Bwk to 50'deep	Replace timbers first 50 ft				2.0w	
Bwk to 580	Rehab shaft and make 580 Level safe for continued dewatering				2.0mo	
DDH in Bswck	Diamond Drill Program in Brunswick Mine				3.5y	
Bwk to 700	Rehab shaft and make 700 Level safe for continued dewatering				2.0mo	
Bwk to 900	Rehab shaft and make 850 Level safe for continued dewatering				2.0mo	
Bwk to 1000	Rehab shaft and make 1000 Level safe for continued dewatering				2.0mo	
Bwk to 1100	Rehab shaft and make 1150 Level safe for continued dewatering				2.0mo	
Bwk to 1300	Rehab shaft and make 1300 Level safe				2.0mo	



As the old workings are dewatered, hydrostatic pressure differentials could potentially occur in previously-backfilled stopes or barricaded development drifts, resulting in a risk to workers. Dewatering will have to carefully consider the following:

- adherence to modern safety practices in the shaft that may not have been in effect in 1957
- quality of water likely to report to the shaft
- location of sumps for cascade pumping
- protection of personnel from the sudden relief of hydrostatic pressure, particularly the risk of the sudden release of stope backfill and/or water from the backfilled stopes or barricaded drifts between 1300 and 1750 levels. This will require information on
    - location of the backfilled stopes.
    - amount and type of backfill used historically in these areas.
    - condition and strength of chute timbers in drifts and fill barricades. Historical documents indicate that bulkheads were constructed from light timber and that newspaper and excelsior were used for caulking. As the mine is dewatered, these materials may fail, releasing sand, backfill or rock to lower levels.

It will be necessary to explore mine levels as the shaft is being dewatered to ensure that risks due to the build up of slimes and other materials have been minimized. Access to some locations of the old mine workings may be restricted as chute timbers may have failed and rock may have spilled out onto the drift. This may result in delays accessing some areas of the mine.

Dewatering Facilities

Gold exploration is planned in the area of the old mine workings. Dewatering of the old workings will be required before drilling into these areas can commence. The old mine workings will be dewatered via a pumping system in the New Brunswick Shaft.

Based on the results of a dewatering study previously completed by Emgold, the mine will be initially dewatered at a rate of 2,700 USgpm, while steady state dewatering will range from 500 to 1,200 USgpm. The dewatering study was based on records that no underground connections exist between the Idaho-Maryland mine and other neighboring flooded mines. For permitting purposes, a maximum of 2,700 USgpm was used for the dewatering permit and the water treatment plant has been designed to handle that rate of pumping. The original dewatering permit expired in January 2003. Application for a new dewatering permit will be included in the conditional mine use permit application.

Pumps will be located within the shaft or at an underground pumping station. Water from the shaft will be pumped to a water treatment facility on surface to remove dissolved iron and manganese. The treatment method proposed is aeration followed by clarification, mixed media filtration and ion exchange. Before it is discharged into the South Fork of Wolf Creek, the water will be treated to meet state and federal requirements for discharge into receiving waters and will be monitored on a continuous basis. A riprap channel will be created at the discharge point to minimize the potential for erosion of the creek bed by the introduction of the additional water. Solids recovered in the water treatment plant will be collected and recycled into the ceramics process.

During maintenance of the treatment plant or in the event that the treated water does not meet specifications, pumping will be suspended until the facility is checked and water discharge quality once again meets the regulated specifications.

As part of the dewatering program, a small headframe and auxiliary driver hoist will be erected at the New Brunswick shaft to support the use of a service cage. A winch will be installed to lower the pumps as dewatering progresses. The headframe will be custom designed to suit the purpose of dewatering and secondary egress.

An 80 ft high concrete ore silo, constructed during past mining operations exists on the New Brunswick site. This silo will be left as a historical relic of a past mining era as it does not hinder planned operations.

Ventilation during Dewatering

There are many raises, shafts and winzes in the Brunswick mine, and resistance to flow-through ventilation is expected to be low. A vent pipe down the shaft should provide ample ventilation for miners working close to the shaft. Secondary ventilation with fans and tubing will be necessary for any work on the mine levels away from the shaft, such as exploration drilling.

Dewatering Schedule

The time needed to dewater the mine workings from the New Brunswick Shaft will be dependant on the rate of rehabilitation in the shaft and levels, and less dependant on pumping capacity. Clear water submersible pumps will dewater the mine at a rate of 2,700 USgpm. Dewatering and shaft rehabilitation will continue to the 1300 Level initially. At the earliest availability, dedicated work crews can access the 580 Level to prepare for exploration work simultaneously with shaft rehab work. Dewatering can continue to the 3280 Level during the full production phase. Mine dewatering, shaft rehabilitation, and exploration drilling schedules are shown in Figure 19-14.

Diamond Drill stations on the decline will make use of muck handling bays (remucks) and can follow 1,000 ft behind the advancing face without interfering with face development. Drilling from the decline is scheduled to start in the 2nd quarter of Year 3.

Exploration for gold resources can start sooner in the Brunswick workings. However, this requires dewatering and rehabilitation of the New Brunswick Shaft. Dedicated mine rehabilitation crews will prepare the 580 Level for exploration drilling as the dewatering of the mine continues in advance of the breakthrough of the decline to 1300 Level.

It is assumed that exploration drilling will encounter targets that require more detail definition drilling and this phase of the work to define and expand gold resources is expected to commence in Year 4.

By the end of Year 5, it is expected that exploration drilling will have outlined resources at or above the 1300 Level, and that dewatering and rehabilitation of the shaft below the 1300 Level could be delayed for an indefinite period as crews are dedicated to pre-production development.

Potential causes of delays in dewatering are as follows:

Delays Incurred by Rehab of Shaft Timbers – Although the camera survey indicated that the shaft timbers are in generally good condition, some timbers will have to be replaced. The alignment of the old timbers may not meet modern specifications, and some may need to be realigned.

Delays Incurred by Work on the Levels – Remedial action may be required on some levels distant from the shaft to eliminate risks to people working at depth. It is difficult to estimate the type and quantity of remedial work required. Although ground conditions were reported to be generally good, chute timbers may have failed, and access to some levels may be hindered or blocked. Air tuggers and slushers can provide primitive mechanization on levels initially, if required. Air, water and secondary ventilation would be required on the levels for machines and portable core drills. Later, 480 V power will be required for contract core drilling on the levels.

Delays Incurred by Dirty Water – Most of the water pumped from the Brunswick mine is expected to be relatively clear. Dirty water pumps will be required if slimes and fines from the previously backfilled areas, for example, make their way to the shaft. Dirty-water pumps cost more than clear water pumps, and have a lower pumping capacity. It may be easier to simply delay pumping and allow time for the material to settle as much as possible before continuing with dewatering.

Shaft Preparation for Re-use

A new 64 ft tall headframe and a hoist house equipped with a double-drum hoist will be constructed on the site. This new hoist will be installed with a cage to lower pumps, personnel and materials to the New Brunswick shaft levels. It will serve as a second emergency escapeway from the mine after the decline breaks through to the Brunswick levels. Hoisting of ore and waste is not planned from the New Brunswick shaft.

All of the water pumped from the mine will be processed through a water treatment plant on the surface. After treatment, the water will meet state and federal standards and will be discharged through a pipeline into the South Fork Wolf Creek. An energy dissipating diffuser (rip rap) will be constructed at the discharge point in the creek to prevent erosion of the creek bed. Several electric powered air compressors will be in use at the water treatment plant.

An electrical power substation and emergency power generator will be installed on the site. The capacity of the electrical systems will be sized to operate the hoist, dewatering pumps, air compressors, and ventilation fan. The emergency generator will be diesel powered and used to operate the hoist only in the event of a power grid failure. Otherwise, the generator will be turned on only periodically for testing.

Table 19-6 lists the costs involved in preparing the New Brunswick Shaft for hoisting. These costs have been supplied by Idaho-Maryland and have not been verified by AMEC. It is noted that shaft-pumping equipment has been selected for clear water pumping.

Table 19-6 does not include costs for installing various safety limit switches, installing a service cage with arresting device and cables, and removing and replacing the first 40 ft of missing or rotted timber. Additionally, delays outlined in the paragraphs above could increase the costs of re-accessing the Brunswick Shaft.

19.1.9 Mining Risks and Opportunities

The following is an outline of a number of areas where cost savings opportunities may exist:

- The portal cut could be left open and the installation of the multi-plate culvert postponed or cancelled.
- A conservative room-and-pillar design has been outlined in this report. An optimization of the design might be justified if additional geotechnical information can be provided.
- The size of the decline can be optimized.
- Longhole mining can be employed. Longhole mining is less expensive than room-and-pillar mining, but requires changes in equipment and manpower levels.

Table 19-6: New Brunswick Shaft Rehabilitation and Gold Exploration

		Pre - Production		Expansion				Full Production					
Item	Cost ($000)	Year 1	Year 2 Q1 + Q2	Year 2 Q3 + Q4	Year 3	Year 4	Year 5 Q1 + Q2	Year 5 Q3 + Q4	Year 6	Year 7	Year 8	Year 9	Year 10
Brunswick Shaft										-	-	-	-
Perimeter Fence	20	20	-	-	-	-	-	-	-	-	-	-	-
Construction of Hoist House	300	300	-	-	-	-	-	-	-	-	-	-	-
Construction of Headframe	450	450	-	-	-	-	-	-	-	-	-	-	-
Hoist Purchase	250	250	-	-	-	-	-	-	-	-	-	-	-
Dewatering Pumps	100	100	-	-	-	-	-	-	-	-	-	-	-
Dewatering Pipe	80	80	-	-	-	-	-	-	-	-	-	-	-
Water Treatment Plant	-	-	-	-	-	-	-	-	-	-	-	-	-
Trident Units	433	433	-	-	-	-	-	-	-	-	-	-	-
Aeration Units	60	60	-	-	-	-	-	-	-	-	-	-	-
Ion exchange resins	190	190	-	-	-	-	-	-	-	-	-	-	-
Installation at 15%	103	103	-	-	-	-	-	-	-	-	-	-	-
Power Substation 12 KV	100	100	-	-	-	-	-	-	-	-	-	-	-
Emergency Generator	50	50	-	-	-	-	-	-	-	-	-	-	-
Air Compressors	200	200	-	-	-	-	-	-	-	-	-	-	-
Exploration Drilling	-	-	-	-	-	-	-	-	-	-	-	-	-
Core drilling 297,000 ft @ $25/ft NQ-BQ size	7,414	-	-	938	1,875	1,875	938	938	851	-	-	-	-
Portable Core Rig	40	-	40	-	-	-	-	-	-	-	-	-	-
Atlas Copco type Simba Drill for Stope Definition drilling	160	-	-	-	-	-	160	-	-	-	-	-	-
Assays, Screen Metallics 15,000 assays @ $35 ea	541	-	-	-	153	175	88	66	60	-	-	-	-
Assays, Fire 34,000 assays @ $12 ea	405	-	-	-	105	120	60	60	60	-	-	-	-
Stope Definition Ring Drilling	7,208	-	-	-	-	-	-	2,403	2,400	-	-	-	-
CP65 Air Powered Core Drill or similar	10	-	-	-	10	-	-	-	-	-	-	-	-
Total Materials & Supplies	**-**	**2,336**	**40**	**938**	**2,153**	**2,171**	**1,245**	**3,466**	**3,371**	**-**	**-**	**-**	**-**
Manpower Cost	*Cost $/yr*						*Number of Personnel*						
Miners	45,100	-	-	-	-	-	3.3	3.3	3.3	-	-	-	-
Nippers, Miners Helpers, Laborers	42,100	-	-	-	-	-	0.7	0.7	0.7	-	-	-	-
Truckers	39,700	-	-	-	-	-	1.6	1.6	1.6	-	-	-	-
Mechanics	45,100	-	-	-	-	-	1.0	1.0	1.0	-	-	-	-
Electricians	45,100	-	-	-	-	-	0.7	0.7	0.7	-	-	-	-
Shaft and Level Rehab		-	-	-	-	-	-	-	-	-	-	-	-
Hoistman	45,100	1.0	1.9	1.9	1.9	1.9	3.8	3.8	3.8	-	-	-	-
Cagetender	42,100	1.0	1.9	1.9	1.9	1.9	3.8	3.8	3.8	-	-	-	-
Shaft and Level Rehab Miners	45,100	6.4	7.8	7.8	7.8	7.8	7.8	7.8	7.8	-	-	-	-
Total		**663**	**452**	**452**	**903**	**903**	**884**	**884**	**1,769**	**-**	**-**	**-**	**-**

Item	Cost ($000)	Pre - Production		Expansion				Full Production					
		Year 1	Year 2 Q1 + Q2	Year 2 Q3 + Q4	Year 3	Year 4	Year 5 Q1 + Q2	Year 5 Q3 + Q4	Year 6	Year 7	Year 8	Year 9	Year 10
Brunswick/Exploration Supervision, Technical Staff													
Surveyors and Technicians	35,900	-	1	2	2	1	1	1	1	-	-	-	-
Shaft Supervisor	69,000	-	1	1	1	1	2	2	2	-	-	-	-
Mine Geologist, Mine Design Geologist	69,000	-	2	2	2	2	4	4	4	-	-	-	-
Diamond Drill Coordinator	69,000	-		1	1	1	2	2	2	-	-	-	-
Samplers, Exploration Technicians	41,000	-	2	2	2	2	4	4	4	-	-	-	-
Total	-	-	**233**	**326**	**632**	**571**	**557**	**557**	**1,114**	-	-	-	-
Shaft, Level Supplies Total	-	129	133	202	404	404	313	313	530	-	-	-	-
Mechanical Maintenance Total	-	28	14	14	33	38	358	358	716	-	-	-	-
Power Total	-	148	296	296	798	798	500	528	1,028	-	-	-	-
Feasibility Study	-	-	-	-	-	-	-	-	-	1,000	-	-	-
EPCM for Brunswick Shaft	15%	350	-	-	-	-	-	-	-	-	-	-	-
Contingency	20%	661	234	446	985	977	772	1,221	1,706	200	-	-	-
Brunswick Shaft / Exploration Total	-	**3,965**	**1,402**	**2,674**	**5,907**	**5,861**	**4,629**	**7,329**	**10,234**	**1,200**	-	-	-
Cumulative Total	-	**3,965**	**5,366**	**8,040**	**13,947**	**19,808**	**24,437**	**31,766**	**42,000**	**43,200**	-	-	-

- Historical data indicates that it is necessary to obtain access to the bottom of the New Brunswick Shaft. It may be necessary to continue the decline to lower levels and delay the rehabilitation of the shaft or consider an internal winze.
- The creation of multiple underground workings in competent ground provides the opportunity to move some facilities underground. Additionally, slimes from dewatering the New Brunswick Shaft can be relocated to mined out openings or blended with feedstock for ceramic production.

19.2 Site Facilities

19.2.1 Site Layout

The Idaho-Maryland project covers three general areas: the 101 acre Idaho-Maryland site property adjacent to the Idaho shaft, the 37 acre Brunswick property around the New Brunswick Shaft, and a 1 acre easement on the Round Hole shaft property.

Most of the new facilities will be constructed on the Idaho-Maryland property (Dwg. 100-C-0005, see Appendix B). These facilities will include the mine access decline portal, vent raise, escape raise, administration and mine dry building, ore stockpiles, process plants, warehouse and truckshop building, electrical substation, visitor's center, and storm water detention and mine water sedimentation ponds.

Facilities will be constructed on the Brunswick property as part of the proposed gold exploration program. These facilities will include a hoist house, headframe and hoist, pumping system for mine dewatering, mine water treatment system, power supply substation, and out building for the emergency generator and air compressors.

19.2.2 Noise Suppression and Dust Control

The surface operations will generate noise from vehicle traffic and from the process plants. Plant design and operating activities will be structured to maintain noise at acceptable levels. During the initial construction of the mine access decline, there will be a requirement to haul material from the mine to a crushing plant on the surface, and then transport the crushed material to a surface stockpile. These activities will be restricted to daylight hours. The primary crusher will be re-located underground once the temporary crusher excavation is complete.

General surface activities utilizing mobile equipment, such as loading and unloading of parts and consumables delivery trucks, will be done during daylight hours. Ceramics delivery trucks will be operated 24 h/d to meet production requirements.

The surface process and ceramics plants, will operate 24 h/d, and will be fully enclosed. Sections of the plant containing equipment that generates high noise levels will also be insulated to minimize external noise levels.

Dust may be generated during crushing and at conveyor transfers points. Water sprays may be used for dust suppression. The levels of dust generation are expected to be minimal as the size of the material will be relatively coarse. Furthermore, the crushed material from the mine is expected to have approximately 5% moisture content, which will serve to minimize dust emissions.

The subsequent processing stages will be completed within the enclosed process plant, and dust control systems will be installed where appropriate. Within the process plant, dust generation is anticipated in the grinding and dynamic classification circuit and in the transfer of ground material to the storage silos ahead of the ceramics manufacturing circuits. In the ceramics plant, dust is anticipated to be generated in the dryers, preheaters, extrusion, and glazing lines. Dust collection will utilize industry proven technology and will consist of forced-air collection in bag-houses.

19.2.3 Decline Portal

The proposed location of the decline portal is at the western end of the Idaho-Maryland site, approximately at the mid-point on a north-south line. The decline extends east, from the portal and at the point where it crosses the surface rights property boundary, it will be approximately 240 ft below surface. Idaho-Maryland controls the mining rights below the 200 ft level.

The decline collar area will consist of a cut for a roadway at a -15% grade for approximately 290 ft, until a depth of 44 ft has been reached, based on a 14 ft cut in bedrock and 30 ft in overburden (assumed). From the surface and extending for approximately 290 ft, a concrete foundation will be constructed and a reinforced steel culvert will be installed. Backfill will be placed over the collar structure. The collar will provide a solid and secure entrance through the overburden and into the bedrock.

During the initial development phase (approximately 10 months), an axial vane fan for mine ventilation will be located near the portal. As soon as an exhaust ventilation raise has been excavated all ventilation fans will be moved underground. The decline will provide access for equipment and personnel to the mining areas and exploration drill stations. Services that feed down the decline will include power lines, fresh water, discharge water, compressed air pipelines, communications lines, and paste backfill lines. A belt conveyor will also be installed to transport crushed ceramic feed material to the surface stockpiles. Escape raises and ventilation shafts are shown on Figure 19-1.

Two 8,500 ton stockpiles will be located immediately to the west of the portal. The crushing and grinding plant will be located immediately to the northeast. The ceramics manufacturing plant will be immediately east of the crushing and grinding plant. A ceramics product loadout and storage area will be located on the east side of the ceramics manufacturing facility. A stormwater retention pond and a mine water sedimentation pond will be constructed in the northwest corner of the Idaho-Maryland property.

To conform to local building guidelines, the surface buildings and surface stockpile will not exceed 50 ft in height.

Processing plant and surface facilities are shown on Dwg. 100-C-0005 Rev E.

19.2.4 Truckshop and Warehouse Building

A 22,500 ft^2 building will house a fully equipped truckshop and warehouse. The truck shop will have four maintenance bays and a maintenance shop for underground haul trucks, mining equipment and other site equipment maintenance. The warehouse will be used to store all spare parts and consumables for site operations. The truckshop and warehouse building will be located slightly south of the portal. Light vehicle maintenance will be performed off site at local vehicle service centers.

19.2.5 Administration Office/Changehouse

An administration office building and employee changehouse complex will be located south of the portal adjacent to the main entrance on the southwest side of the property. Employee/visitor parking will be provided adjacent to the property entrance and administration building. A visitors center will be established adjacent to the administration building.

The main entrance for employees, service/supply contractors and visitors will be at the southwest corner of the Idaho Maryland property. The access road to the main entrance will originate from East Bennett Road, southeast of the entrance area.

The office/changehouse will be a 17,000 ft^2 facility with offices located on the main and second floors and the changeroom located in the basement. Offices will be provided for mine, mill and ceramics plant management staff, human resources, accounting, safety, and other administration personnel. The changehouse will have showers, clean/dirty lockers, and changerooms for 350 personnel. It is anticipated that a maximum of 150 personnel will be present in the changeroom during normal shift change. Changehouse facilities will be provided for male and female employees. The administration building will include a first aid room and mine rescue training area.

The visitors' center will be approximately 5,200 ft^2 and will be used for presentation of historic information about Grass Valley and its mining heritage with special emphasis on the Idaho Maryland mine. Displays will describe modern mining practices and recovery methods and how they are used at the Idaho Maryland. Sufficient space will be provided to seat up to 30 people for presentations. Public washrooms will be available. It is anticipated that gold mining souvenirs will be sold, with proceeds defraying the costs of the center and any profits going to local charities.

19.2.6 Power Supply

The average power demand for the underground mine, surface processing plant, ceramics manufacturing plant, and ancillary facilities, at the initial 1,200 ton/d production rate will be approximately 9,200 kW. Upon completion of the process plant expansion to 2,400 ton/d, the average power demand will be approximately 18,500 kW.

A main high voltage powerline runs approximately 1,300 ft to the east of the proposed power substation at the Idaho Maryland property. Based on a power study completed by Emgold for the New Brunswick site, it has been assumed the power provider will supply and construct the required transmission line to the site and site substation at Idaho Maryland's cost. In the past, however, these costs have been typically financed by power and/or capital equipment finance companies.

The site is located in a town with light industrial areas nearby and the power distribution network appears to be well developed. The Pacific Gas and Electric Company provides power in the area.

19.2.7 Natural Gas Supply

Natural gas will be used to fire the rotary dryers and heaters in the ceramics manufacturing process. It is estimated that approximately 3,200,000 ft^3 of natural gas will be consumed per day at the 1,200 ton/d production rate and 6,400,000 ft^3/d at the 2,400 ton/d production rate. A natural gas pipeline will be installed to the site.

19.2.8 Fresh and Process Water Supply

It is anticipated that once the mine site is annexed into the City of Grass Valley, the mine will be able to connect to the Grass Valley potable water supply system. Potable water may also be available from the Nevada County Irrigation district. Potable water requirements are estimated at 35 US gal/d per person, or approximately 11,000 US gal/d for 314 employees. It is planned to use mine water for process makeup water requirements.

19.2.9 Sewage Services

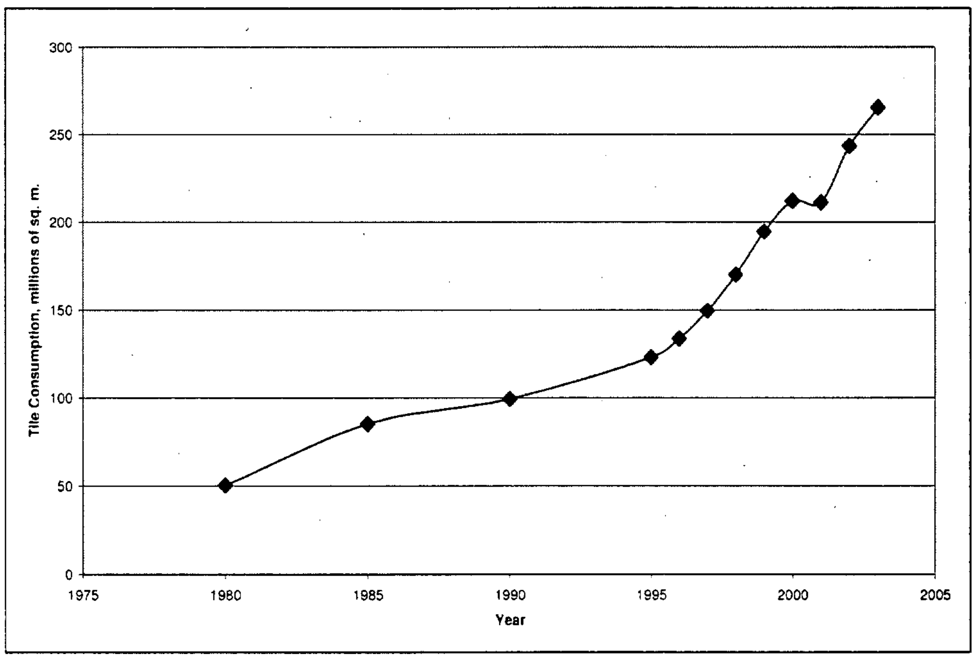
It is anticipated that once the mine site is annexed into the City of Grass Valley, the mine will be able to connect to the Grass Valley sewage system. Based on a workforce of 314 employees and an estimated 25 US gal/d of waste per employee, 8,000 US gal/d will be fed to the Grass Valley sewage system

19.3 Market Evaluation

Large markets exist for ceramic building products and the use of ceramic building products in the USA has increased significantly over the last decade. For example, ceramic tile consumption has more than doubled in the past decade, as illustrated in Figure 19-15.

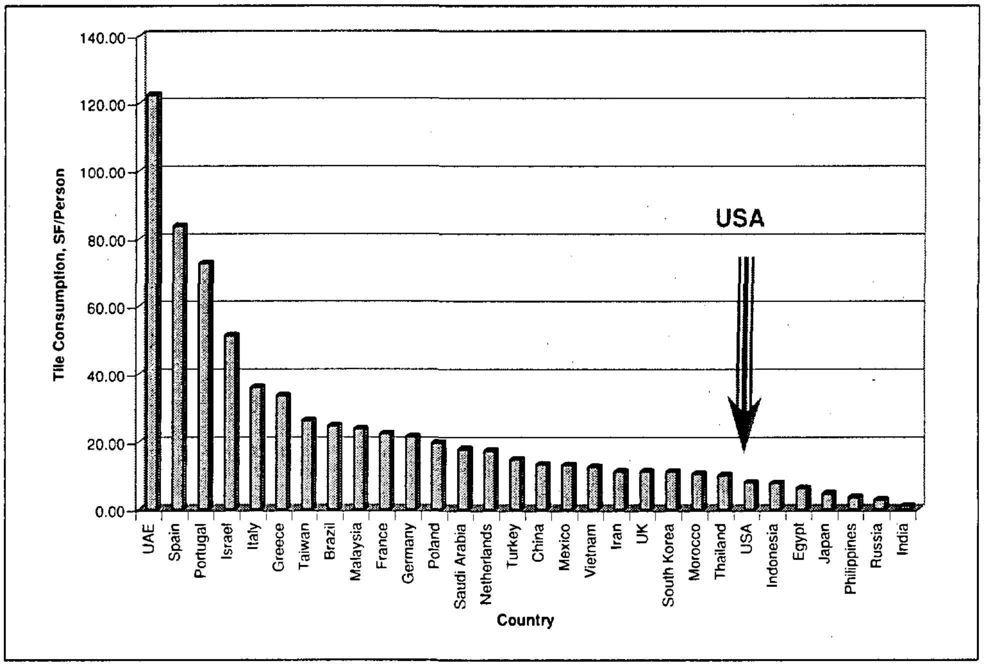
This trend has been spurred by the construction boom and by the increased use of tile at the expense of floor coverings like carpet. Despite this growth, there is considerable potential for additional growth. Tile consumption in the USA, on a per capita basis, is amongst the lowest in the world, as shown in Figure 19-16.

Figure 19-15: Consumption of Ceramic Tile in the USA, 1980 to 2003



Note: Consumption is presented in square meters, 1 m^2 = 10.76 ft^2. *USA: Steady Growth in Tile Sales*, Tile International, Jan/March, 2004, p. 78-79.

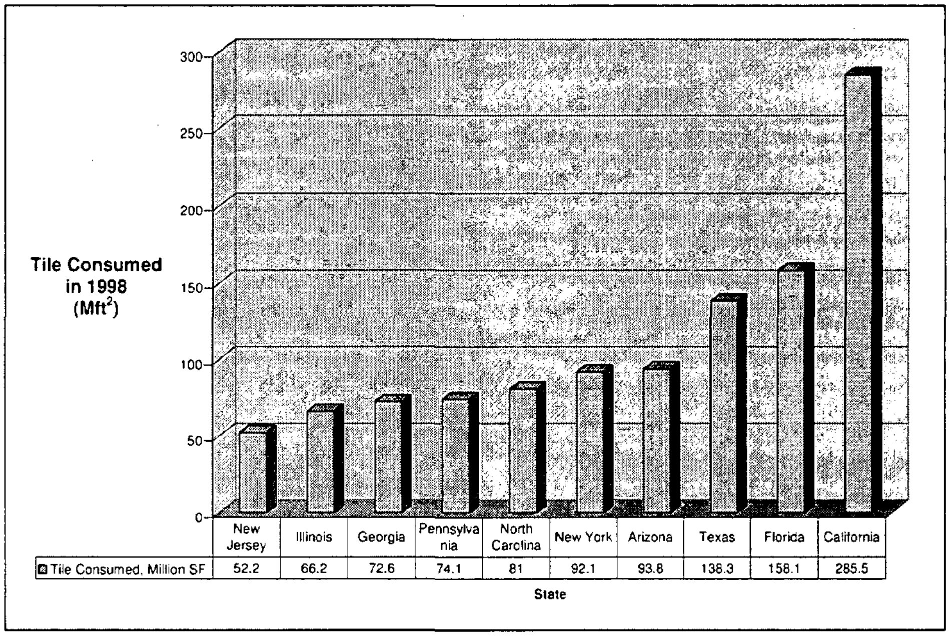
Figure 19-16: Comparison of Per Capita Tile Consumption by Country in 2001



California represents the largest market for tile in the USA. This is illustrated in Figure 19-17, which presents consumption in 1998. Consumption in California for 2003 is estimated to have been about 445 Mft^2. Market entry for Idaho-Maryland Mining Corporation will thus be eased by the large local market.

If all material available from the Idaho-Maryland mine were processed into ceramic tile, the initial stage of mine development could produce approximately160 Mft^2 of tile. Production is planned in a new facility adjacent to the Grass Valley mine operation. This represents approximately 5% of 2003 USA tile consumption and 35% of 2003 California consumption. The second stage of mine development would double this production level. Given that the initial stage of mine development is likely to be three years away, that tile consumption continues to rise, and that there are no significant producers of tile in the West, market entry appears to be a viable enterprise. When the mine reaches expected full production levels, production would represent 320 Mft^2 of tile if all material were converted to tile. This is unlikely, since production of other ceramic products, such as roof tile and upscale brick pavers, is planned.

Figure 19-17: Ceramic Tile Consumption in Top Ten States in USA (1998)



Given the superior properties of tile and other products using Ceramext™ technology, the market strategy to be adopted would be to compete in the higher ends of the marketplace. For ceramic tile, this would include vitrified floor tile and porcelain tile products. These command higher retail prices and also represent the major share of the market growth in recent years. Target markets would include large commercial projects (malls, commercial office space, restaurants, civic projects) and upscale home floor, wall, and countertop installations, both for new construction and renovation. Factory selling prices in the \$1.00 to \$1.50/ft^2 are expected.

19.3.1 World Market for Ceramic Products

The initial market for products produced using Ceramext™ hot extrusion technology would most likely be in the USA. However, the world market for products is considerably larger outside the USA.

19.3.2 Ceramic Tile

The market for ceramic tile in the USA has been discussed. The consumption of ceramic tile products in the USA is given at 2,260 Mft^2 in 2001 and 2,850 Mft^2 in 2003. The consumption in 2001 for the top thirty consuming countries was 48,000 Mft^2, and 2003 was proportionately larger (see Table 19-7). Probable value of the 2001 production would be $40 to 50 billion if it had been delivered to a USA port. Providing a value for total production is complicated by the fact that tile from Italy is significantly more expensive than tile from China. China is the largest consumer and producer of ceramic tile, dwarfing any other country by a large margin. In 2001, China had consumption and production at one-third of the entire world market. Note that China consumed as much as it produced and has not been a major factor in the export/import market. By 2002, China's production level had increased by 5,000 Mft^2, about double the entire consumption of the USA. This level of production growth continues, and China has now become a factor in the import market to the USA. As well, China is now a real factor in the export markets worldwide. China continues to invest in state-of-the-art tile manufacturing facilities, primarily relying on Italian technology. Porcelain tile formats as large as 1 m^2 are being produced in quantity. Tile production by country is presented in Figure 19-18 and Chinese tile production is presented in Figure 19-19.

Table 19-7: Worldwide Ceramic Tile Consumption in 2001

Rank	Country	Tile Consumption, 2001 (m^2)	(ft^2)	% of World Consumption	2003 Population in Millions	Consumption per Person (ft^2)
1	China	1,600,000,000	17,222,240,000	32.9	1,287,197,000	13.38
2	Brazil	417,000,000	4,488,546,300	8.6	181,937,000	24.67
3	Spain	312,000,000	3,358,336,800	6.4	40,128,000	83.69
4	USA	210,000,000	2,260,419,000	4.3	286,288,000	7.90
5	Italy	192,000,000	2,066,668,800	3.9	57,558,000	35.91
6	Indonesia	168,000,000	1,808,335,200	3.5	234,798,000	7.70
7	Germany	164,000,000	1,765,279,600	3.4	81,958,000	21.54
8	Mexico	129,000,000	1,388,543,100	2.7	105,403,000	13.17
9	France	125,000,000	1,345,487,500	2.6	60,046,000	22.41
10	India	102,000,000	1,097,917,800	2.1	1,047,590,000	1.05
11	Vietnam	95,000,000	1,022,570,500	2.0	81,593,000	12.53
12	Turkey	94,000,000	1,011,806,600	1.9	68,055,000	14.87
14	Iran	71,000,000	764,236,90(	1.5	68,222,000	11.20
13	Poland	71,000,000	764,236,90(	1.5	38,646,000	19.78
15	Portugal	68,000,000	731,945,20(	1.4	10,076,000	72.64
16	UK	62,000,000	667,361,80(	1.3	59,689,000	11.18
17	Thailand	60,000,000	645,834,00(	1.2	64,096,000	10.08

Rank	Country	Tile Consumption, 2001 (m^2)	Tile Consumption, 2001 (ft^2)	% of World Consumption	2003 Population in Millions	Consumption per Person (ft^2)
19	Taiwan	55,000,000	592,014,50(	1.1	22,585,000	26.21
18	Japan	55,000,000	592,014,50(	1.1	127,409,000	4.65
20	Malaysia	51,000,000	548,958,90(	1.0	23,012,000	23.86
21	South Korea	50,000,000	538,195,00(	1.0	48,187,000	11.17
22	Egypt	43,000,000	462,847,70(	0.9	74,436,000	6.22
23	Saudi Arabia	40,000,000	430,556,00(	0.8	23,934,000	17.99
24	Russia	38,000,000	409,028,20(	0.8	143,959,000	2.84
25	Greece	33,000,000	355,208,70(	0.7	10,602,000	33.50
26	Morocco	31,000,000	333,680,90(	0.6	31,723,000	10.52
27	Israel	29,000,000	312,153,10(	0.6	6,054,000	51.56
29	UAE	28,000,000	301,389,20(	0.6	2,462,000	122.42
28	Philippines	28,000,000	301,389,20(	0.6	84,648,000	3.56
30	Netherlands	26,000,000	279,861,40(	0.5	16,025,000	17.46
			47,867,063,300			

Figure 19-18: Ceramic Tile Production by Major Producing Countries in 2001

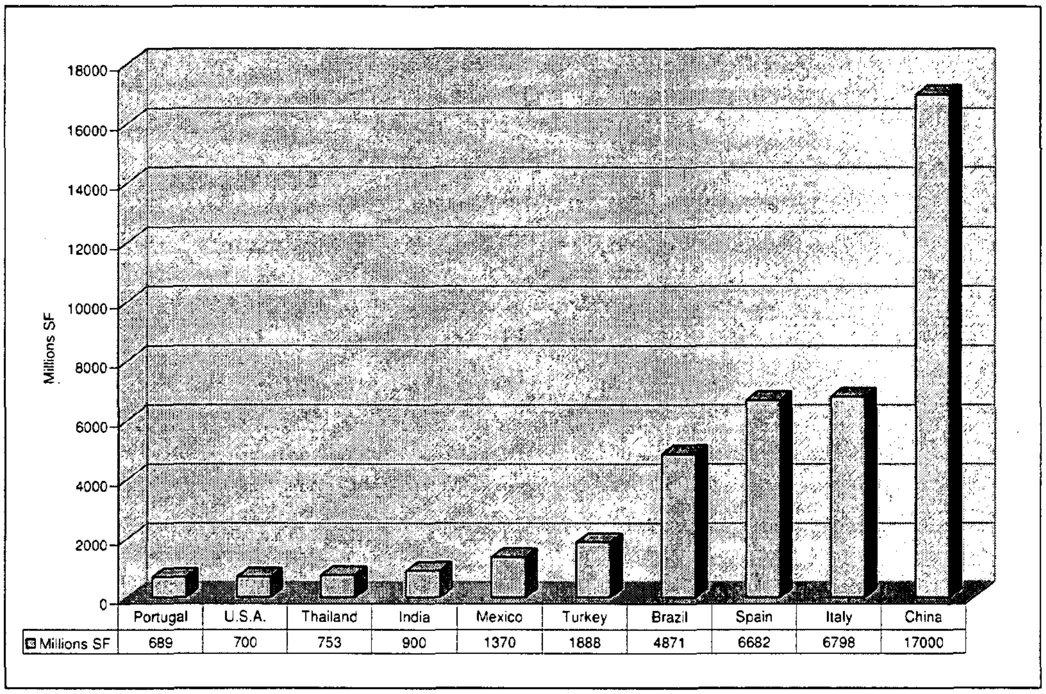
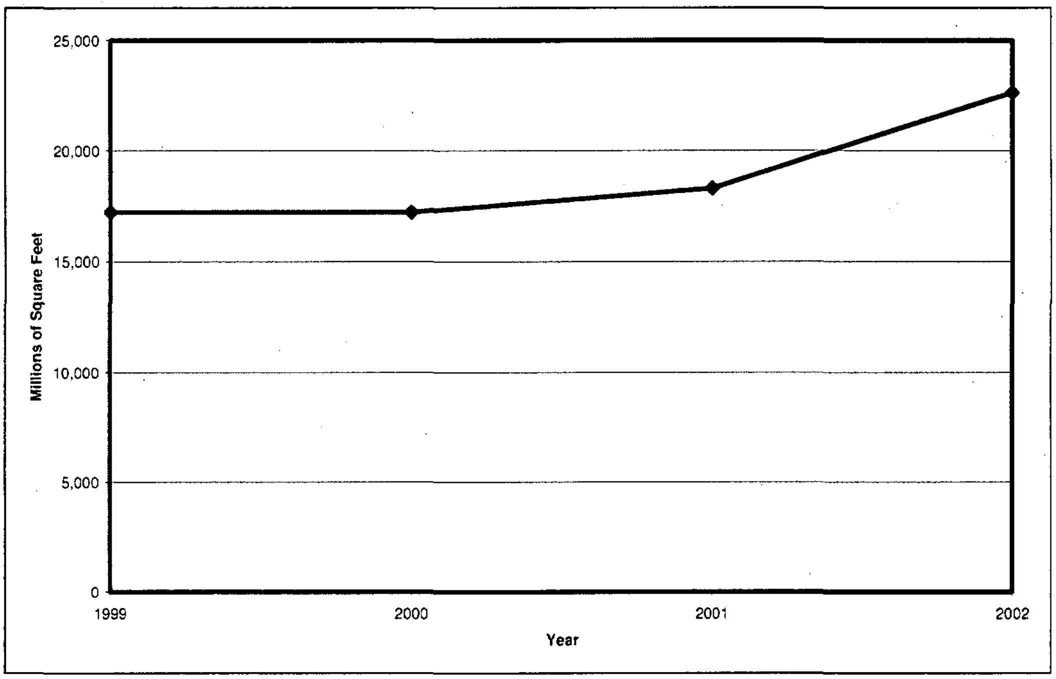


Figure 19-19: Chinese Ceramic Tile Production, 1999 to 2002



Note: Exploring the Chinese Ceramic Industry, Tile International, Jan/March, 2004, p. 46-48

19.3.3 Ceramic Roof Tile

The total market for roofing products is expected to reach 75 Bft^2, by 2008. The market in North America is dominated by bituminous roofing tile and products. In the industrialized countries, growth is controlled by the re-roofing market, with growth rates of about 2% per year. The USA has the largest roofing market in the world. In developing countries, the rate of growth is higher, and ceramic and concrete tiles are a larger market factor. Worldwide, tile roofing, including ceramic and concrete tile products, accounted for over 6.5 Bft^2, of consumption in 2003. Growth is fastest in the developing countries of Asia and Eastern Europe. China, for example, will see growth rates of 6% per year.

Traditional Spanish- or mission-style ceramic tile, commonly used in climates that generally do not experience freeze/thaw weather conditions, are made from clay-based, porous ceramic compositions. These materials produce roofs that are relatively heavy and thus require substantially heftier supporting construction. Traditional colors are reddish brown with darker "flashing" patterns common. Some tile are glazed or colored by body additions. Such tile is not highly resistant to walking loads, which occur during installation or roof maintenance.

There's a significant spread in installed costs when it comes to roofing materials. Asphalt shingle roofs can cost anywhere from $50 to $150 or more per square (100 ft^2, or a 10 ft x 10 ft area). Tearing off the existing shingles, which is highly recommended, will add another $30 to $50 per square. Metal roofing and concrete tiles may start at $100 per square, or run up to $600 a square and more for coated steels and copper. Ceramic tile and slate are always high-priced. Clay tiles can cost $300 to $500 installed per square. Slate, with its need for skilled and experienced craftsmen, could cost up to $1,000 a square. Assuming the value of the roof tile is half the installed cost, the world market for ceramic and concrete roofing products in 2003 was in the $10 to 15 billion range.

Ceramext™ technology allows production of substantially stronger ceramic bodies, which have very low water absorption. Thus, walking loads on thinner and lighter tile are less troublesome, and freeze/thaw resistance will be high. Glazed surfaces, with the variety of colors and patterns this can produce, are feasible. In addition, on a per-square-foot basis, roof tile commands a higher price than floor or wall tile.

19.3.4 Ceramic Brick

Production of ceramic brick using Ceramext™ technology is perhaps less attractive than other products because of the low market prices for brick. Traditional brick is made using very low cost clay-based natural materials. In the USA, most plants are highly automated, and this will be a trend in developing countries as well. The consumption of brick is enormous worldwide, since it has a long tradition. In many developing countries, brick is still produced by labor and energy intensive hand methods.

According to the US Commerce Department, shipments of common and facing brick increased 1.2% in 2002 to 8.04 billion equivalent brick units (EBU) at a value of $1.72 billion, compared to 7.94 billion EBU at a value of $1.68 billion in 2001. Shipments of brick in 1999 were 9 billion EBU.

Brick is a very common building material worldwide, especially in Europe.

19.3.5 Other Ceramic Products

The products listed above have relatively simple shapes and are construction oriented. Other products are also possible. These include tableware, abrasion resistant materials, ceramic ballistic armor, and chemical resistant brick and flooring materials. However, these will take additional development work.

19.3.6 Market Summary

Table 19-8 summarizes estimates for the markets that can most readily be addressed using Ceramext™ technology.

Table 19-8: Ceramic Production

	Production Volume		Dollar Volume	
Product	US Market	World Market	US Market	World Market
Ceramic tile	3 Bft^2	50 to 55 Bft^2	3 B	40 to 50 B
Roof Tile	200 Mft^2	6.5 Bft^2	300 M	6 to 10 B
Brick	8 EBU	150 to 200 EBU	2 B	30 to 40 B

19.3.7 Marketing Channels

There are a number of marketing and sales channels that are available. At this point the channel or mix of channels has not been selected.

Factory Direct Showrooms: Larger companies, such as Dal Tile, have their own "factory" showroom stores in many cities. Such direct marketing cuts middlemen costs but requires the overhead of the showrooms, personnel, inventory, and direct advertising. It can also tend to limit sales through other outlets, such as independent tile distributors. Selling through factory-direct channels is an option for Golden Bear/Idaho-Maryland, since companies such as Dal Tile purchase a portion of their tile from overseas.

Independent Distributors: There are a large number of large and small independent tile distribution companies. Many are regional, with warehouse showrooms in several or a number of cities in a regional area. A few examples in California include Bedrosians and Spec Ceramics.

Large Volume Retail Outlets: The large do-it-yourself megastores, like Home Depot and Lowes, stock and sell a modest line of ceramic tile. Such tile, which includes products from companies like Dal Tile and American Mazaratti as well as imported tile, is sold at discounted prices. Tile tends to be limited to simpler patterns, colors, and sizes. Since there are so many outlets, large amounts of tile can be moved, but profit margins for the manufacturers tend to be quite low.

19.3.8 Production Costs

Although it is difficult to obtain production cost information from tile manufacturers, the cost for domestic manufacturers such as Dal Tile (with plants in Mexico and the USA) is currently approximately $.60/ft^2. They have a goal of $.50 to $.55/ft^2. This includes manufacturing overhead but not corporate overhead. Factory selling prices for Italian manufacturers is in the $0.90 to $1.00/ft^2 range. For the lowest cost manufacturers, such as those in China, the factory-selling price is in the $0.35 to $0.45/ft^2 range. These prices do not include shipping costs.

The estimated direct production at Idaho-Maryland, utilizing the Ceramext™ process indicates manufacturing costs will range from $0.32 to $0.37/ft^2 for tile during the start-up phase and $0.31/ft^2 at full production. These figures include manufacturing plus corporate general and administration costs. The cost of sales and marketing is expected to add another $0.13/ft^2. These production costs compare favorably to current production costs experienced by other manufacturers. The Idaho-Maryland production costs are presented in detail in Section 19.5.

19.4 Capital Cost Estimate

19.4.1 Summary

The estimated capital cost to design and construct the mine, processing facilities, and ancillary facilities to process 1,200 ton/d of feed is $195,914,000. The estimated cost to expand to the mine and processing facilities to 2,400 ton/d is an additional $154,652,000. Total project estimated capital cost is $350,566,000. The capital cost estimate is considered to have an accuracy of ±35%. All costs are presented in 4th quarter 2004 US dollars (see Table 19-9).

Table 19-9: Capital Cost Estimates (x 000)

Cost Area	Pre-production Capital	Expansion Capital	Subtotal ($)
Mine facilities	18,123	37,867	55,990
Site preparation & major civil works	2,579	200	2,779
Process	71,070	64,211	135,281
Utilities	4,290	620	4,910
Ancillary facilities	8,345	-	8,345
Surface vehicles	1,220	-	1,220
Owner's costs	33,850	-	33,850
Indirects	56,437	51,755	108,192
Total	195,914	154,652	350,566
Brunswick Rehab & Gold Exploration	-	-	43,000,000
Grand Total	-	-	393,566,000

A contingency of 20% on direct costs has been included for the 1,200 ton/d and 2,400 ton/d estimates. Contingency is included in the Indirects cost category.

The project total cost presented above does not include a working capital allowance. An additional $9,950,000, equivalent to three months of estimated plant operating cost, is recommended for working capital on commissioning of the 1,200 ton/d plant.

Separate from the ceramic mine and plant project cost, an additional $43,000,000 has been included to complete dewatering and rehabilitation of the Brunswick mine workings, and to perform a gold exploration program primarily in the areas of the previous Brunswick and Idaho-Maryland workings. The cost of a feasibility study on the potential gold project has been included in this amount.

The total project capital cost including mine, plant and gold exploration program is $393,566,000.

19.4.2 Mine Capital Costs

Capital costs for the mine have been allocated to start-up, expansion, and sustaining capital. Start-up capital covers all costs incurred until plant start-up for 18 months until mid Year 2. Once the plant has started producing, ramp development, room-and-pillar access, benching and slashing has all been allocated to operating costs as the material produced will be ceramic plant feed.

After initial plant start-up, only the following expenditures have been allocated to expansion capital:

- excavation for the crusher, and coarse ore bin
- installation of crusher, conveyor and ancillary facilities
- mobile equipment required to elevate production from 1,200 to 2,400 ton/d.

After Year 3 the mine reaches a steady state scenario and only replacements and rebuilds for the aging equipment fleet and stationary equipment have been included in sustaining capital.

The underground mine capital costs are presented in Tables 19-10 and 19-11.

Table 19-10: Underground Capital Costs for Ceramics Feedstock Mining

	Pre - Production		Expansion				Full Production					
	Year 1	Year 2 Q1 + Q2	Year 2 Q3 + Q4	Year 3	Year 4	Year 5 Q1 + Q2	Year 5 Q3 + Q4	Year 6	Year 7	Year 8	Year 9	Year 10
Underground Mobile Equipment	6,951	1,651	3,425	4,403	1,747	511	495	2,225	2,633	2,915	959	3,024
Underground Stationary Equipment	915	-	-	122	18,812	-	-	122	-	238	-	-
Specialized Development												
Boxcut and Portal + Support of First 100 ft in Hard Rock	598	-	-	-	-	-	-	-	-	-	-	-
Temporary Exhaust/Escapeway	-	36	-	-	-	-	-	-	-	-	-	-
Crusher Excavation	-	-	-	208	80	-	-	-	-	-	-	-
Coarse Ore Bin Excavation	-	-	-	-	302	-	-	-	-	-	-	-
Alimak Escapeway, Raisebore	-	-	-	-	-	1,060	-	-	-	-	-	-
Mine Access Development												
Direct Labor: Miners, Mechanics, Electricians	708	723	-	-	-	-	-	-	-	-	-	-
Supplies	377	653	-	-	-	-	-	-	-	-	-	-
Mechanical and other Operating Costs	899	764	-	-	-	-	-	-	-	-	-	-
G&A Indirect Labor: Supervision and Technical	1,068	663	-	-	-	-	-	-	-	-	-	-
Contractor Mobilization and Profit	530	414	517	1,709	-	-	-	-	-	-	-	-
Power	551	622	-	-	-	-	-	-	-	-	-	-
Decline Access to Brunswick Mine (Waste)	-	-	-	-	-	-	-	-	-	-	-	-
Direct Labor	-	-	73	1,192	93	-	-	-	-	-	-	-
Supplies	-	-	57	869	66	-	-	-	-	-	-	-
Mechanical	-	-	78	1,185	90	-	-	-	-	-	-	-
Power	-	-	73	1,110	84	-	-	-	-	-	-	-
Pre-production Mine Capital (in thousands of dollars)	12,598	5,526	-	-	-	-	-	-	-	-	-	-
Expansion Mine Capital	-	-	4,223	10,798	21,274	1,571	-	-	-	-	-	-
Sustaining Mine Capital	-	-	-	-	-	-	495	2,347	2,633	3,153	959	3,024

Table 19-11: Underground Mobile Equipment Acquisition Schedule for Ceramics Feedstock Mining

		Pre - Production		Expansion				Full Production					
Underground Mobile Equipment	Cost per Equipment	Year 1	Year 2 Q1 + Q2	Year 2 Q3 + Q4	Year 3	Year 4	Year 5 Q1 + Q2	Year 5 Q3 + Q4	Year 6	Year 7	Year 8	Year 9	Year 10
Cat 730 Trucks	641,333	3.0	-	1.0	3.0	1.0	-	-	1.0	1.0	1.0	-	-
Trucks like MT 5010	959,790	-	-	-	-	-	-	-	-	-	-	-	-
Jumbo 2 Boom with computerized control	816,270	1.0	-	1.0	1.0	0.5	-	-	0.5	-	1.0	-	1.0
Bolter like Boltec 235, or Robolt 06	702,000	-	1.0	-	-	-	0.5	-	-	-	-	1.0	-
Bolter Like MacLean 946	546,000	1.0	-	1.0	-	-	-	-	-	1.0	-	-	-
Scissor Deck	210,000	1.0	1.0	-	-	-	-	-	2.0	-	-	-	2.0
Wheel Loader Cat 966 (New)	365,000	1.0	1.0	-	-	-	-	-	-	-	-	-	-
Blasting Truck	365,000	1.0	-	-	-	0.5	-	-	-	1.0	-	-	0.5
LHD like ST 15-10 or Toro 1400	780,000	1.0	-	1.0	1.0	-	-	0.5	-	0.5	1.0	-	1.0
Service Vehicles	60,000	1.0	1.0	-	-	-	1.0	-	1.0	-	-	1.0	1.0
Grader	250,000	1.0	-	-	-	-	-	-	1.0	-	-	-	-
HIAB	60,000	1.0	-	-	1.0	-	-	-	-	-	1.0	-	-
Shotcrete Machine	40,000	2.0	-	-	-	-	-	-	-	-	2.0	-	-
Portable Compressors	4,000	3.0	2.0	-	1.0	-	-	-	3.0	2.0	1.0	-	3.0
Jacklegs	4,000	5.0	-	-	-	5.0	-	-	-	5.0	-	-	2.0
Stopers	4,000	2.0	-	-	-	5.0	-	-	-	5.0	-	-	2.0
Fan 150 hp	17,000	1.0	-	-	1.0	-	-	-	-	-	-	-	-
Fan 75 hp booster	8,000	1.0	1.0	-	1.0	-	1.0	-	1.0	1.0	1.0	1.0	1.0
Flygt Pumps	8,000	2.0	-	3.0	-	-	-	2.0	3.0	-	-	2.0	3.0
Flygt Pumps	1,000	-	-	3.0	-	-	-	-	3.0	-	-	-	-
Pick-up Truck (surface)	40,000	3.0	-	-	-	3.0	-	-	-	3.0	-	-	3.0
Van (surface)	40,000	1.0	-	-	-	1.0	-	-	-	1.0	-	-	1.0
Total[1]		6,951	1,651	3,425	4,403	1,747	511	495	2,225	2,633	2,915	959	3,024

[1] Includes insurance, freight and spare parts

19.4.3 Process Plant and Ancillary Facilities

Table 19-12 shows the estimated direct capital costs for the process plant and ancillary facilities.

Table 19-12: Estimated Direct Capital Costs (x 000)

Cost Area	1,200 ton/d	2,400 ton/d	Total
Site preparation & improvements	2,579	200	2,779
Crushing, grinding & materials handling	19,196	11,637	30,833
Ceramics plant	51,873	52,573	104,446
Power & plant services	4,290	620	4,910
Auxiliary buildings	8,345	-	8,345
Total	86,283	65,030	151,313

19.4.4 Basis of Estimate

Capital cost estimates are based on the scope of work defined in this report. The estimates can be considered accurate to within ±35%, which is consistent with an order of magnitude study. All costs are in 4th quarter 2004 US dollars with no allowance for escalation.

The capital cost estimate is based on the following information:

- Design criteria
- Preliminary mine plan and equipment list
  - site plan
  - process flowsheet and equipment lists
- General arrangement sketches
- Verbal and email quotations from vendors for the mining equipment, crushers, high pressure grinding rolls and ancillary equipment, and the rotary kilns
- Costs for the ceramics processing plant provided by Idaho-Maryland
- In-house database.

The following capital costs have been provided by Idaho-Maryland

- Land acquisition
- Geology, permitting, development

- Nevada Irrigation District costs for potential water supply works
- The cost to supply and install the ceramics manufacturing plant but excluding related site services, plant services, site improvements and EPCM services, which been factored from the ceramics plant cost.

Mining

The mining capital costs are expressed as pre-production, expansion and sustaining capital. Start-up covers the period from regulatory approval for the project through to start-up of the mill at 1,200 ton/d. Expansion covers the period required to bring the mill and mine to full production at 2,400 ton/d. Sustaining capital covers the periodic replacement or rebuilds of underground mobile and stationary equipment.

Estimates for costs and productivities have been derived from base principles and compared with AMEC's experience at operating mines. Verbal quotes have been sought for costs of key items, including underground machinery, explosives, cables and rockbolts. Parameters for productivity estimates have been derived from base principles. Labor rates for mine supervision and technical staff have been provided by Idaho-Maryland.

The cost of dewatering and rehabilitation of the Brunswick Mine and the gold exploration program are summarized in Table 19-6. These costs have been treated separately from the costs associated with the industrial minerals extraction.

It is assumed that a mining contractor will be on site during start-up and expansion and that specialized contract crews will be brought in to do such tasks as crusher excavation and installation, Alimak raise and raisebore.

Processing and Ceramics Production

The cost estimates for the crushing plant and ancillary facilities have been estimated based on the following:

- mechanical equipment has been itemized using pricing based on new equipment.
- piping, electrical, and instrumentation equipment and installation costs are a factored based on the mechanical equipment cost.
- process and ancillary buildings have been itemized and based on a cost per square foot, including foundation, structure and finishing as appropriate.
- coarse ore stockpile estimates do not include covers and the conveyors do not include galleries.

The capital cost estimate for the ceramics manufacturing plant has been provided by Idaho-Maryland. The overall cost provided by Idaho-Maryland includes the contained equipment, freight and installation. The extruder cost has been factored based on the cost of the Gen II extruder built for pilot plant testing. Budget quotations were solicited by Idaho-Maryland for the raw material blenders, the pre-heaters and feed screw conveyors. Allowances were made for the presses, cutters, transfer equipment, glazing systems, annealing systems and product handling and packaging systems. The capital spares allowance is based on 5% of the installed equipment cost.

AMEC has added costs for site improvements, auxiliary buildings, plant services and EPCM services. AMEC has been provided with only limited backup detail regarding the ceramics process plant and costs, and there is no commercial plant in existence utilizing the Ceramext™ process on which to compare costs, therefore AMEC cannot comment of the validity of the capital cost estimate provided by Idaho-Maryland.

Dr. Frahme has reviewed the capital cost and considers it reasonable based on the scope of work.

Permits

The capital cost allowance for the permitting has been provided by Idaho-Maryland. Permitting cost estimates include $1,200,000 for the development or "use" permit.

- Owner's Costs
- The following Owner's costs have been provided by Idaho-Maryland
- Land acquisition
- General and administration costs
- Geology, permitting, development
- Nevada Irrigation District costs for potential water supply works.

Indirect Costs

The estimate is based on the following indirect costs:

- Start up cost is for initial engineering and vendor assistance and is estimated at 2% of direct cost
- Freight costs are estimated at 3 % of the total equipment and material costs, excluding the ceramics plant
- Spare parts are estimated at 5% of the mining, mechanical, and electrical equipment costs

- EPCM cost is estimated at 15% of the direct cost
- A contingency of 20% has been included on all costs (with the exception of Owner's costs) to include items within the project scope that are unforeseen at this time, as well as for errors and omissions within the cost estimate.
- A working capital allowance equal to three months of the estimated process operating cost has been included separately.

Assumptions

The capital cost estimate is based on the following assumptions:

- All equipment and material procurement and the tendering of installation contracts will be on a lump sum basis
- Site work will not be constrained by local and regional authorities
- Skilled tradesmen, supervisors, and contractors are available locally
- The owner will provide temporary services and utilities.
- All costs outside of the scope of this report are excluded
- The costs provided by Idaho-Maryland for the ceramics manufacturing plant are reasonable and achievable.

Exclusions

Costs for the following items have been excluded from the capital cost estimate:

- Cost of this or any other study unless specifically identified
- Any applicable city, county, state, and federal duties or taxes
- Costs associated with installation of the required power line extensions and substations
- Geotechnical studies
- Exploration
- Financing or legal costs
- Escalation beyond 4th quarter 2004
- Owner's costs
- Scope changes.

19.5 Operating Cost Estimate

19.5.1 Summary

The estimated overall project operating costs for the 1,200 ton/d mining and ceramics manufacturing facility range between $124/ton and $145/ton of plant feed during the first three years of production. The variation is due primarily to the mine operating costs, which vary significantly over this period.

The estimated overall project operating cost for the 2,400 ton/d mining and ceramics manufacturing facility are $122/ton of plant feed or $0.31/ft^2 of ceramic tile product.

The mining, crushing and grinding costs have been developed by AMEC based on typical industry experience and costs from other projects of similar scope.

The operating costs for the Ceramics manufacturing process have been provided by Idaho-Maryland. There is no commercial installation of the Ceramext™ process on which to base the projected operating costs.

The estimated total operating costs per ton of plant feed and per square foot of tile production are presented in Tables 19-13 and 19-14.

19.5.2 Mine Operating Costs

Table 19-15 shows an estimate of the operating costs for mining ceramics feedstock. In Year 4, when infrastructure is in place and the mine reaches steady state production at 2,400 ton/d, 816,000 ton/yr, the mining cost falls to below $31/ton. Slashing and benching is significantly lower cost than drifting but represents only 62% of the total production coming from room-and-pillar. The balance is supplied by the initial drifting before slash and the access drifts.

Table 19-13: Operating Costs by Year $/ton of Feed Processed

	Pre-Production		Expansion				Full Production					
	Year 1	Year 2 Q1 + Q2	Year 2 Q3 + Q4	Year 3	Year 4	Year 5 Q1 + Q2	Year 5 Q3 + Q4	Year 6	Year 7	Year 8	Year 9	Year 10
Tons/d			***1,200 t****	***1,200 t****	***1,200 t****	***1,200 t****	***2,400 t****	***2,400 t***	***2,400 t***	***2,400 t***	***2,400 t***	***2,400 t***
Mining	-	-	20.28	28.87	34.90	40.93	26.10	30.21	30.81	29.68	30.09	28.75
Process	-	-	97.07	97.07	97.07	97.07	90.22	88.22	88.22	88.22	88.22	88.22
G&A	-	-	7.01	7.01	7.01	7.01	3.50	3.50	3.50	3.50	3.50	3.50
Total	-	-	124.36	132.95	139.97	145.01	119.82	121.93	122.53	121.40	121.81	120.47

* plant feed is combination of mined production and temporary stockpile reclaim

Table 19-14: Operating Costs by Year $/ft^2 of Ceramic Product

	Pre-Production		Expansion				Full Production					
	Year 1	Year 2 Q1 + Q2	Year 2 Q3 + Q4	Year 3	Year 4	Year 5 Q1 + Q2	Year 5 Q3 + Q4	Year 6	Year 7	Year 8	Year 9	Year 10
Tile production			160,754,000 ft²/yr				321,507,000 ft²/yr					
Mining	-	-	0.05	0.07	0.09	0.10	0.07	0.08	0.08	0.08	0.08	0.08
Process	-	-	0.25	0.25	0.25	0.25	0.23	0.22	0.22	0.22	0.22	0.22
G&A	-	-	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Total	-	-	0.32	0.34	0.36	0.37	0.31	0.31	0.31	0.31	0.31	0.31

Table 19-15: Underground Operating Costs for Ceramics Feedstock Mining

	Pre - Production		Expansion				Full Production					
	Year 1	Year 2 Q1 + Q2	Year 2 Q3 + Q4	Year 3	Year 4	Year 5 Q1 + Q2	Year 5 Q3 + Q4	Year 6	Year 7	Year 8	Year 9	Year 10
Room-and-Pillar: Develop Slash and Bench												
Tons Produced	-	-	91,897t *	346,774t *	414,916t *	245,433t *	355,401t *	832,007t	834,349t	791,012t	808,483t	804,272t
Direct Labor: Miners, Mechanics, Electricians	-	-	953	3,169	3,772	1,759	2,443	6,243	6,261	5,996	6,109	6,077
Supplies	-	-	864	3,196	4,129	2,709	4,094	9,568	9,595	9,100	9,299	9,236
Mechanical and other Operating Costs	-	-	949	2,484	2,843	1,862	2,080	4,299	4,310	4,159	4,178	3,277
G&A Indirect Labor: Supervision and Technical	-	-	693	1,387	1,387	746	746	1,492	1,492	1,492	1,492	1,492
Power	-	-	677	1,543	1,624	1,274	1,287	3,047	3,485	3,472	3,472	3,377
Total Underground Operating Costs ('000s)	-	-	4,137	11,778	14,642	8,349	10,649	24,648	25,142	24,218	24,551	23,459
Operating Cost/t	-	-	45	34	35	34	30	30	30	31	30	29

* for periods when mine production is less than plant production and feed is drawn from surface stockpile

19.5.3 Process Operating Costs

At a production feed rate of 1,200 ton/d the estimated total processing costs for the ceramics manufacture is \$97.07/ton of feed or \$0.25/ft^2 of finished ceramic product. Upon achieving a 2,400 ton/d production rate the estimated total processing cost is \$88.22/ton or \$0.22/ft^2 of finished ceramic product. Table 19-16 provides an outline of the operating costs.

Table 19-16: Process Operating Costs (\$/ton)

Description	1,200 ton/d	2,400 ton/d
Manpower	17.30	14.16
Consumables	38.61	34.75
Electrical power	16.36	16.60
Natural gas	22.61	22.61
Mobile equipment	0.19	0.10
Temporary Stockpile Handling	2.00	-
Total	97.07	88.22

Crusher consumables consist of jaw crusher plates, cone crusher bowls and mantles, screen decks, conveyor belting and idlers, and lubricants. Grinding consumables consist primarily of replacement rolls for the high pressure grinding rolls and wear surfaces in the dynamic separator.

The ceramics process consumables will consist primarily of glazing material for ceramics finishing. Maintenance consumables in the ceramics plant will consist mainly of wear parts in the dryers, preheaters, screw feeders, blenders and extruders.

The utilities cost is based on an electrical power rate of \$0.09/kWh and a natural gas rate of \$0.85 per Therm (100,000 Btu). These costs have been provided by Idaho-Maryland and are based on current indicative rates from Pacific Gas and Electric Company. The estimated total power consumption for the plant and surface facilities is 75,000 MWh/yr for the 1,200 ton/d production rate and 150,000 MWh/yr at the 2,400 ton/d production rate.

Natural gas will be used for drying and heating in the ceramics process. The natural gas consumption is estimated to be 3,200,000 and 6,400,000 ft^3/d for the 1,200 and 2,400 ton/d production rates respectively.

Plant mobile equipment includes one front-end loader, twelve forklifts, two bobcats and a flatdeck truck with a hoist. An additional four forklifts will be added for the ceramics plant expansion. Fuel charges for the plant mobile surface equipment are based on current pricing of \$2.20/gal for gasoline in the City of Grass Valley.

During the first 36 months of plant operation, an additional $2.00/ton has been included to cover the cost of reclaiming the temporary stockpile materials.

19.5.4 General and Administration Costs

The G&A operating costs are estimated to be $7.01/ton and $3.50/ton for the 1,200 ton/d and 2,400 ton/d production rates. The G&A costs include senior project management personnel and administration personnel, office supplies, communications, training, outside specialty consultants, vehicles, and general site maintenance and labor. The G&A operating costs are outlined in Table 19-17.

Table 19-17: G&A Operating Costs

Description	Annual Cost ($)
Manpower	2,173,200
Office supplies	70,000
Computers, printers & Copiers	177,600
Telephone	24,600
Building maintenance	75,000
Community Support	100,000
Training	40,000
Consultant services	168,000
Vehicles	30,000
Total	2,858,400

Office supplies includes stationary, postage, safety supplies, and employee coffee service. Computers, printers, and copiers include the lease/rental and service costs for 40 computers, 9 printers, and 5 copiers.

Building maintenance costs were based on approximately 1% of the value of all surface buildings, with the exclusion of the crushing, grinding and ceramics process buildings. Fuel and operating costs for non-mine-related vehicles were based on a fleet of fifteen pickup trucks and passenger cars.

An allowance of $168,000 has been made for outside specialists consultants, predominately in the mining, processing environmental and socio-economic disciplines.

An allowance has been made for employee training, which will likely include both onsite and offsite courses and seminars.

As the project is very close to a town and residential areas, an allowance has been made to maintain an administrative office in Grass Valley, and to cover public relations costs.

19.6 Financial Analysis

19.6.1 Summary

The Idaho-Maryland project was analyzed using a discounted cash flow approach assuming 50% equity in 4th quarter 2004 US dollars. Projections for annual revenues and costs are based on data developed for the mine, process plant, production of the ceramic products, capital expenditures and operating costs. Estimated project cash flows were used to determine the pre-tax net present value (NPV) and internal rate of return (IRR) for the base case.

Results of the minimum performance base case analysis indicate that the project has a potential pre-tax internal rate of return of 45.8% and a pre-tax NPV $1,111,143,000 at a discount rate of 10.0% (see Table 19-18). The payback period is estimated at 4.8 years from first production. The base case mine life is 20 years. The cash flow model is presented in Appendix F.

Table 19-18: Variation in NPV with Discount Rate and IRR

	0%	10%	20%	30%	40%
NPV (US'000)	3,706,755	1,111,143	392,891	139,238	32,893
IRR (%)	45.8	-	-	-	-

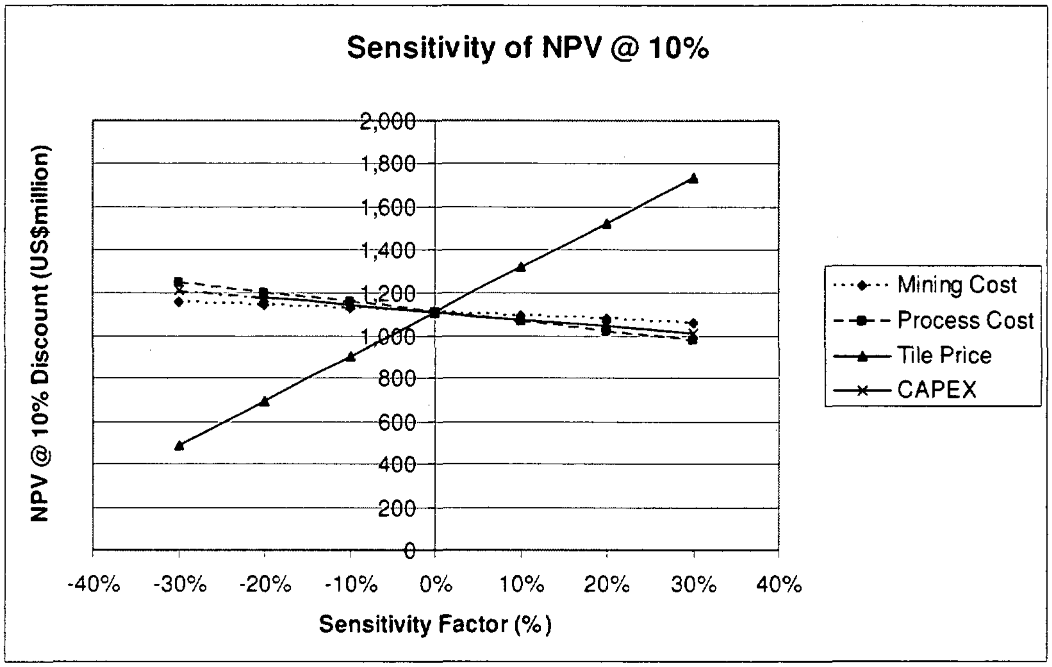
19.6.2 Sensitivity Analysis

Sensitivity analysis was performed by varying mining cost, process cost, ceramic tile price and capital expenditure across a range of minus 30% to plus 30%. The cash flow model is most sensitive to changes in tile price, significantly less so in terms of process cost and capital expenditure, and least sensitive to mining cost changes (see Figure 19-20).

19.6.3 Valuation Methodology

A discounted cash-flow analysis was used to value the Idaho-Maryland project. This method requires projecting annual cash inflows (or revenues), and then subtracting annual cash outflows such as operating costs and sustaining capital costs. The resulting net annual cash flows are discounted back to the date of valuation at a chosen discount rate, and totaled to determine the project's NPV. The date of valuation is assumed to be the date of regulatory approval for the project. For discounting purposes, cash flow is accounted at the end of the year.

Figure 19-20: Sensitivity of NPV



An internal rate of return is calculated, equivalent to the rate of return at which NPV equals zero. The payback period is stated as the number of years from the production start date required to pay back the initial capital investment, excluding sunk costs, and based on the undiscounted cash flow.

19.6.4 Ceramics Marketing

No independent marketing study has been prepared for this Preliminary Assessment. The financial analysis is based on the assumption that all the ceramic products produced by Idaho-Maryland can be sold at the prices indicated by Dr. Carl Frahme. A general review of the ceramics market fundamentals including current pricing has been prepared by Dr. Frahme and is presented in Section 19.3 of the report. Dr. Frahme is an independent consultant with expertise in ceramics manufacture and marketing. He is the Qualified Person under NI 43-101 requirements for all aspects of ceramics manufacture and marketing addressed in this report.

An allowance of 10% of sales revenue has been included to account for the cost of sales and marketing. This is an addition to the direct and indirect operating costs presented in Section 19.5.

19.6.5 Taxation

AMEC has included only California sales tax of 7.5% on equipment and materials in this financial analysis. Future financial evaluation should include an assessment of all applicable county, state and federal taxation.

19.6.6 Royalties

Royalties on ceramic product production have been allowed for in the financial analysis. Idaho-Maryland has stated that royalties of 3% and 5% of ceramic product sales are payable to Ceramext™ LLC and Golden Bear Ceramics Company, respectively.

19.6.7 Other Assumptions

The major assumptions used in developing the cash flow model are outlined below.

- Valuation date of 1 January 2007 is based on the anticipated date of regulatory approval for the project. The valuation is based on a three year pre-production and construction period.
- End-of-year cash flows have been used for discounting purposes.
- Working capital equal to approximately three months operating cost at the 1,200 ton/d rate has been included.
- The financial analysis is based on 100% equity financing.
- An allowance of 10% of sales revenue has been included to cover the costs of outside sales and marketing.
- Product pricing has been based on FOB Idaho-Maryland site. No allowance has been made for product delivery charges.
- Product losses and insurance have not been included in the financial analysis
- No allowance was made for inflation of revenues or costs.
- The financial analysis has assumed that there is no salvage value for replaced equipment.
- Ore grade is assumed to be 100%
- All mined material is converted to tile and value is realized in the year of productions.

19.7 Manpower

19.7.1 Mine Labor

Direct manpower estimates have been based on the following productivities:

Drifting	18 ft wide x 20 ft high	3.35 ft/manshift
Room-and-pillar Drift, Slash, Bench	25 ft wide x 40 ft high	136 ton/manshift

For every 10 miners it is estimated there will be three mechanics, two electricians and two nippers/miner's helpers.

Indirect manpower includes mine supervision and technical staff. Clerical and janitorial staff has been included in surface manpower cost estimates.

Table 19-19 summarizes mine labor costs.

Table 19-19: Underground Operating Labor Productivities and Manpower

			Pre - Production		Expansion				Full Production					
			Year 1	Year 2 Q1 + Q2	Year 2 Q3 + Q4	Year 3	Year 4	Year 5 Q1 + Q2	Year 5 Q3 + Q4	Year 6	Year 7	Year 8	Year 9	Year 10
Direct Labor: Miners, Mechanics, Electricians	*Incentive and Shift Differential Bonus (%)*	*Base Rate (ea $/yr)*												
Dev't Miners for ramp but excluding room and pillar and accesses	100	45,100	3.4	7.6	9.5	7.4	0.4	0.9	-	-	-	-	-	-
Dev't Miners R&P Dev't Slash Bench	100	45,100	-	-	0.3	6.7	15.5	18.2	28.6	33.4	33.5	31.8	31.9	32.9
Nippers, Miners Helpers, Laborers	70	42,100	0.7	1.5	2.0	2.8	3.2	3.8	5.7	6.7	6.7	6.4	6.4	6.6
Truckers	50	39,700	2.8	4.3	6.1	15.0	16.5	9.3	8.9	16.5	16.6	16.5	16.6	16.5
Crusher Operator	20	42,100	-	-	-	-	-	-	-	1.2	1.2	1.2	1.2	1.2
Mechanics	15	45,100	1.0	2.3	3.0	4.2	4.8	5.8	8.6	10.0	10.1	9.5	9.6	9.9
Electrician	15	45,100	0.7	1.5	2.0	2.8	3.2	3.8	5.7	6.7	6.7	6.4	6.4	6.6
Carpenter	-	45,100	-	-	-	-	-	-	-	-	-	-	-	-
Janitor Dryman	-	27,000	-	-	-	-	-	-	-	-	-	-	-	-
Total Labor (number of miners)			9.0	18.0	23.0	39.0	44.0	42.0	58.0	75.0	75.0	72.0	72.0	74.0
Total Cost (thousands)			708	723	953	3,169	3,554	1,759	2,443	6,243	6,261	5,996	6,013	6,158
Mine Management: Supervision, Technical Staff		*Base Salary*												
Mine Superintendent		100,000	1	1	1	1	1	1	1	1	1	1	1	1
Mine General Foreman		80,000	1	2	2	2	2	2	2	2	2	2	2	2
Mechanical Supervisor		58,000	2	2	2	2	2	2	2	2	2	2	2	2
Engineers		58,000	2	2	2	2	2	2	2	2	2	2	2	2
Chief Geologist		71,200	1	1	1	1	1	1	1	1	1	1	1	1
Surveyors and Technicians		35,900	2	2	2	2	2	2	2	2	2	2	2	2
Shift Supervisors		69,000	2	2	2	2	2	3	3	3	3	3	3	3
Data Entry Clerk		34,500	1	1	1	1	1	1	1	1	1	1	1	1
Mine Secretary		39,000	1	1	1	1	1	1	1	1	1	1	1	1
Safety Officer		67,100	1	1	1	1	1	1	1	1	1	1	1	1
Total Labor (number of staff)			13	15	15	15	15	16	16	16	16	16	16	16
Total Cost (thousands)			1,068	663	693	1,387	1,387	746	746	1,492	1,492	1,492	1,492	1,492

19.7.2 Process Plant Labor

The process plant will employ 131 people at the 1,200 ton/d production rate and 238 at the 2,400 ton/d production rate. Staff will generally work a five day 40 hour per week schedule. Hourly operations and maintenance personnel will work a 4 days, 12 hours per day shift followed by four days off.

The manpower rosters for the mine and for the crushing and grinding plant have been developed by AMEC based on typical manning levels for projects of similar scope. The G&A manpower roster was developed by Idaho-Maryland and AMEC considers it appropriate for a project of this scope.

The manpower roster for the ceramics manufacturing plant has been provided by Idaho-Maryland. There are no commercial operations utilizing the Ceramext™ process on which to base manpower requirements, and therefore AMEC cannot confirm or comment on the validity of the manpower roster provided by Idaho-Maryland.

An outline of the process manpower roster is presented in Table 19-20.

Table 19-20: Process Labor

Position	1,200 ton/d	2,400 ton/d
Supervision & Administration		
Process Manager	1	1
Ceramics Plant Superintendent	1	1
General Process Foreman	1	1
Maintenance Superintendent	1	1
Shipping & Receiving Superintendent	1	1
Secretary	1	1
Subtotal Supervision & Administration	6	6
Technical		
Process Engineer (Crush/grind)	1	1
Process Engineer (Ceramics)	2	2
Metallurgical Technician	1	1
Subtotal Technical	4	4
Total Process Plant Staff	10	10
Process Operations		
Crushing & Grinding		
Shift Supervisors	4	4
Operator (Crush/Grind)	4	4
Laborers (crush/grind)	4	4
Warehouse supervisor	1	1
Warehousemen	4	4
Loader/Forklift Operator	4	4

Position	1,200 ton/d	2,400 ton/d
Subtotal Crush/Grind	21	21
Ceramics Plant		
Shift Supervisors	4	4
Ceramics Technicians	12	24
Quality Control Technicians	2	4
Extruder Operators	20	48
Ceramics Finishers	20	48
Glaze Technicians	8	16
Sample Prep Laborers	2	4
Warehousemen	8	24
Subtotal Ceramics Plant	76	172
Mill Maintenance		
Maintenance Planner	1	2
Electrical Foreman	1	1
Electricians (Crush/Grind)	2	4
Electricians (Ceramics)	4	4
Instrumentation Techs (Crush/Grind)	2	2
Instrumentation Techs (Ceramics)	2	4
Mechanics (Crush/Grind)	4	4
Mech. Helpers (Crush/Grind)	2	4
Mechanics (Ceramics)	4	6
Mech. Helpers (Ceramics)	2	4
Subtotal Plant Maintenance	24	35
Total Process Plant Hourly	121	228
Total Process Plant Workforce	131	238

19.7.3 General and Administration Manpower

The general and administrative manpower includes the project General Manager, secretary plus accounting, human resources, purchasing, environmental, safety and community relations personnel. A small inside sales team is also included in G&A. G&A hourly employees include janitorial and site maintenance personnel. The G&A manpower roster will remain the same for both the 1,200 ton/d and 2,400 ton/d production rates.

The G&A manpower roster is presented in Table 19-21.

Table 19-21: G&A Manpower

Position	Total
Administration Staff	
General Manager	1
Secretary	1
Chief Accountant	1
Accountants	2
Accounting Clerks	2
Human Res. Manager	1
Human Resources Secretary	1
Safety Officer	1
Purchasing Manager	1
Community Relations Coordinator	1
Environmental Coordinator	1
Subtotal Administration Staff	13
Inside Sales Staff	
Sales & Marketing Manager	1
Sales Representatives	2
Product Development Manager	1
Secretary	1
Subtotal Sales Staff	5
Plantsite Maintenance Staff	
Plant Site Superintendent	1
Maintenance Planner	1
Draftsman	1
Subtotal Plantsite Maintenance Staff	3
Plantsite Hourly	
General Maintenance Man	1
Laborers	2
Janitor/Dryman	2
Subtotal Plantsite Maintenance Hourly	5
Total Administration, Sales & Maintenance	26

19.8 Project Schedule

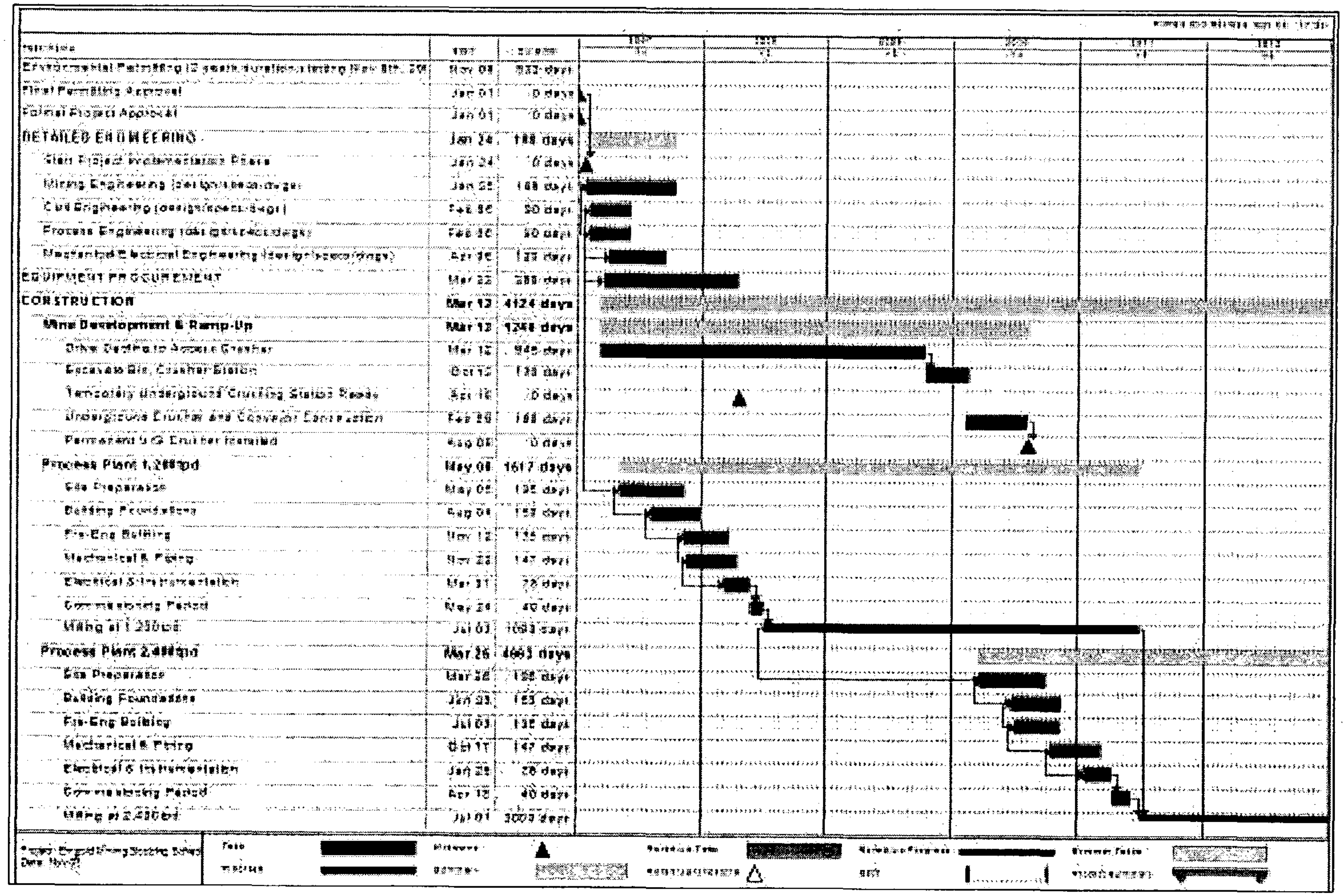
The project schedule consists of five distinct stages: 1) securing permits and completion of feasibility study, 2) detail engineering, 3) driving of a decline to the industrial minerals mining area and development of initial mine excavation areas and exploration drill stations, 4) construction of the surface process and ancillary facilities, and 5) expansion of the mine production and surface process plant capacities.

Securing of permits and completion of a feasibility study is expected to require up to 24 months after submittal of the Final Application for the Conditional Mine Use Permit. Detail engineering and development of the mine, construction of the surface plant and facilities is scheduled to require an additional 18 months. Overall, the implementation is estimated to be 36 to 42 months from submittal of the permit application to the start of production for the 1,200 ton/d project.

The expansion to 2,400 ton/d is projected to be completed 36 months after the initial start of the 1,200 ton/d processing plant.

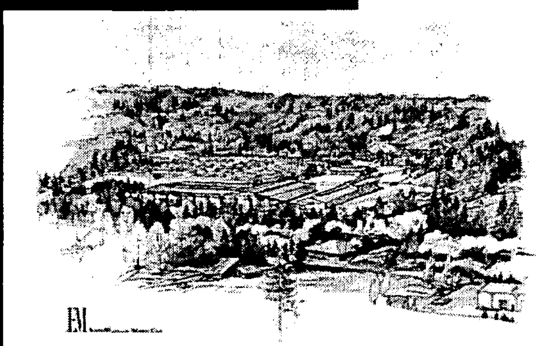
The overall project schedule is presented in Figure 19-21.

Figure 19-21: Overall Project Schedule



PRELIMINARY ASSESSMENT TECHNICAL REPORT

EMGOLD Idaho-Maryland Mining Corporation



SECTION 20

Conclusions and Recommendations

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20.0 CONCLUSIONS AND RECOMMENDATIONS

20.1 Conclusions

This Preliminary Assessment Report was completed to assess at the conceptual level the economic potential to develop an industrial minerals mine and establish an associated ceramics production facility. A key parameter to the viability of the project is the commercial application of the new, proprietary Ceramext™ technology. The findings of this preliminary assessment are based entirely on the assumption that the technology may ultimately be successfully applied in a commercial application. Currently there are no commercial installations utilizing the Ceramext™ technology.

Recognizing the assumption and limitations stated above, the findings of the preliminary assessment indicate that the general concept of development of an industrial minerals mine and an associated ceramics production facility warrants further development and study.

20.2 Recommendations

Should Idaho-Maryland elect to proceed with this project AMEC recommends work be completed to validate the study assumptions and collect additional data to advance the project.

20.2.1 Mining

- Additional geotechnical drilling will be required to characterize rock parameters in the areas of the proposed mine development
- As more information is generated concerning the resource, the mine development plan should be assessed to determine the optimum mining plan.
- A study should be conducted to quantify the mine ventilation requirements
- A trade-off study should be completed to assess the optimum method of material haulage

20.2.2 Process

A suite of samples, representative of the mineral resources to be used for Ceramext™ processing, should be collected from the drill core and forwarded for testing as outlined Section 20.2.3.

20.2.3 Crushing and Grinding

- Determine the grinding work index, abrasion index and unconfined compressive strength of the major types of industrial minerals to be used for ceramics manufacture.
- Determine the moisture content of the major run-of-mine rock types and of the crushing circuit product so that process drying requirements can be defined.
- Conduct pilot high-pressure grinding roll testwork on representative samples of the major rock types.

20.2.4 Ceramics Manufacture

It will be very important to continue pilot testing of the Ceramext™ process to confirm the technical viability of the process. Testing should be performed on samples representative of the major rock types to be used for ceramics manufacture. The following aspects should be assessed:

- The anticipated types of feed rock to assess/confirm that the Idaho-Maryland industrial mineral resource is suitable for Ceramext™ processing and to increase the confidence in the scale–up parameters
- Identify and quantify minerals present in the industrial mineral feed that may be deleterious to the Ceramext™ process
- Testing and evaluation of Ceramext™ ceramic products to fully assess product range, quality and specifications
- Test ceramic finishing methods to identify and confirm product finish specifications including glazing, coloring and texture
- Durability of key Ceramext™ process equipment components
- Operating costs of the Ceramext™ process.

20.2.5 Ceramics Marketing

The potential Ceramext™ ceramic product suite shall be determined in pilot plant testing. A market evaluation for the ceramic markets should be conducted to evaluate the following:

- current market trends
- technical specifications of key products
- specific product demand
- regional product demand

- marketing channels
- market place competition
- marketing, sales, and distribution costs.

20.2.6 Dewatering of Historic Mine Workings

It has been stated in a previous section that water will be tested and pumping stopped if water is contaminated.

A comprehensive study of mine records is needed to locate areas that have been backfilled and to quantify the risks associated with re-accessing these areas during dewatering.

A study should be initiated to identify an optimum dewatering rate, taking into account capital and operating costs.

20.2.7 Site Assessment

AMEC agrees with the recommendation made by MACTEC that an additional Environmental Site Assessment is warranted to determine if recognized environmental conditions exist on the Idaho-Maryland properties and if so, identify the appropriate remedial actions and associated costs.

20.2.8 Gold Processing (Future)

Idaho-Maryland has stated that it intends to continue gold exploration on the Idaho-Maryland property. Should the gold exploration program be successful in identification of a potentially economic gold resource then the following metallurgical testwork should be performed to quantify the metallurgical response of the gold mineralization.

- conduct gravity concentration testwork to determine the potential and requirements for gravity gold recovery
- assess the grind versus gravity gold recovery relationship
- assess the grind versus flotation recovery relationship
- conduct flash flotation and conventional flotation tests on gravity circuit tailings
- determine response of gravity and flotation concentrates to intensive cyanidation
- conduct cyanide destruction and metals removal tests on intensive cyanidation process tailings

- determine overall gold recovery
- conduct settling and filtration testwork to assess dewatering parameters
- review the possible impact of scheelite on the gravity circuit
- conduct a preliminary study on the possible economic recovery of a tungsten by-product
- review the possible impact of graphitic black slate on flotation.

20.2.9 Financial Evaluation

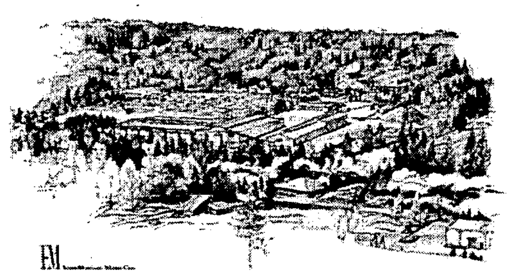
Future financial evaluations should include the following:

- assessment of applicable country, state, and Federal taxation
- product losses and insurance.

PRELIMINARY ASSESSMENT
TECHNICAL REPORT

EMGOLD Idaho-Maryland Mining Corporation

SECTION 21



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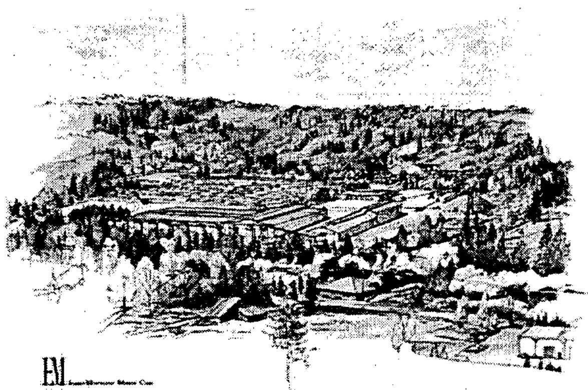
Appendix A



Patents

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US006547550B1

(12) **United States Patent**
Guenther

(10) **Patent No.: US 6,547,550 B1**
(45) **Date of Patent: Apr. 15, 2003**

(54) **APPARATUS FOR HOT VACUUM EXTRUSION OF CERAMICS**

(76) Inventor: **Ross Guenther**, P.O. Box 1320, Pollock Pines, CA (US) 95726

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/596,271**

(22) Filed: **Jun. 16, 2000**

(51) **Int. Cl.**[7] **B29C 47/54**

(52) **U.S. Cl.** **425/73**; 419/60; 419/67; 425/79; 425/376.1; 425/405.1

(58) **Field of Search** 425/73, 79, 376.1, 425/405.1, 405.2; 72/271, 272, 273; 419/60, 67

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4,785,574 A	*	11/1988	Fiorentino	425/79
4,963,709 A		10/1990	Kimrey, Jr.	
5,043,120 A		8/1991	Corrigan	
5,297,480 A		3/1994	Miyashita et al.	

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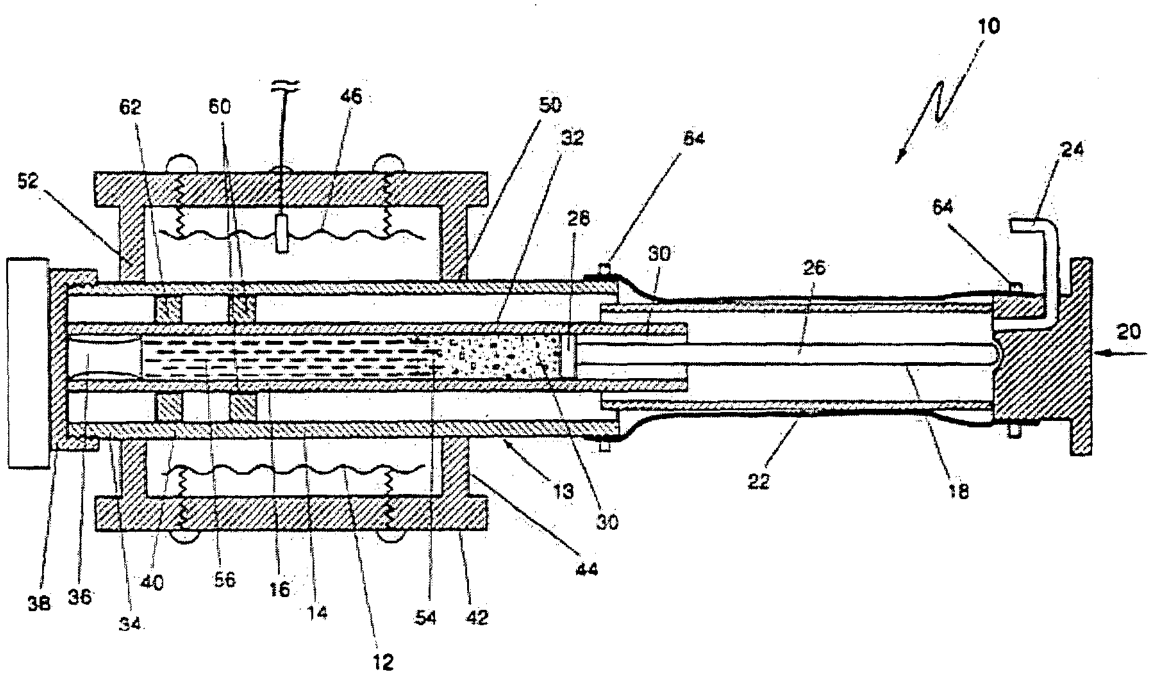
Primary Examiner—Jan H. Silbaugh
Assistant Examiner—Joseph Leyson
(74) *Attorney, Agent, or Firm*—Bernhard Kreten

(57) **ABSTRACT**

This specification discloses a method and apparatus for forming and extruding ceramic materials. The apparatus utilizes a vacuum chamber mounted within a heating chamber or element; and the ceramic forming chamber is mounted within the vacuum chamber. A press is slidably mounted within vacuum and forming chambers in order to apply pressure to the ceramic materials during the heating step and subsequently during the ceramics extrusion step. The heating chamber applies heat to the vacuum chamber and forming chamber during the sintering and extrusion step. The forming chamber preferably remains in position within the vacuum chamber during the entire ceramic article manufacturing process.

12 Claims, 8 Drawing Sheets



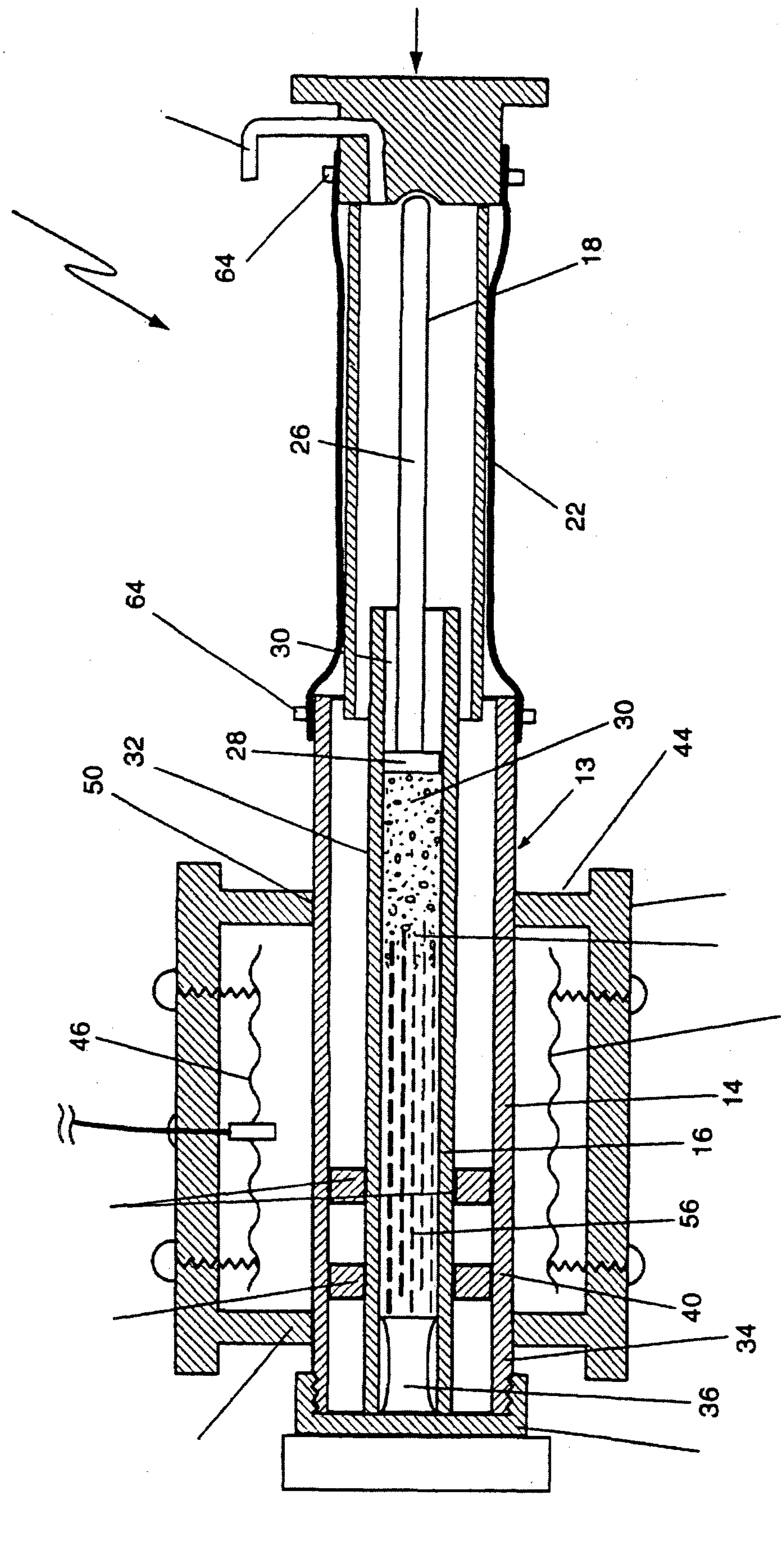
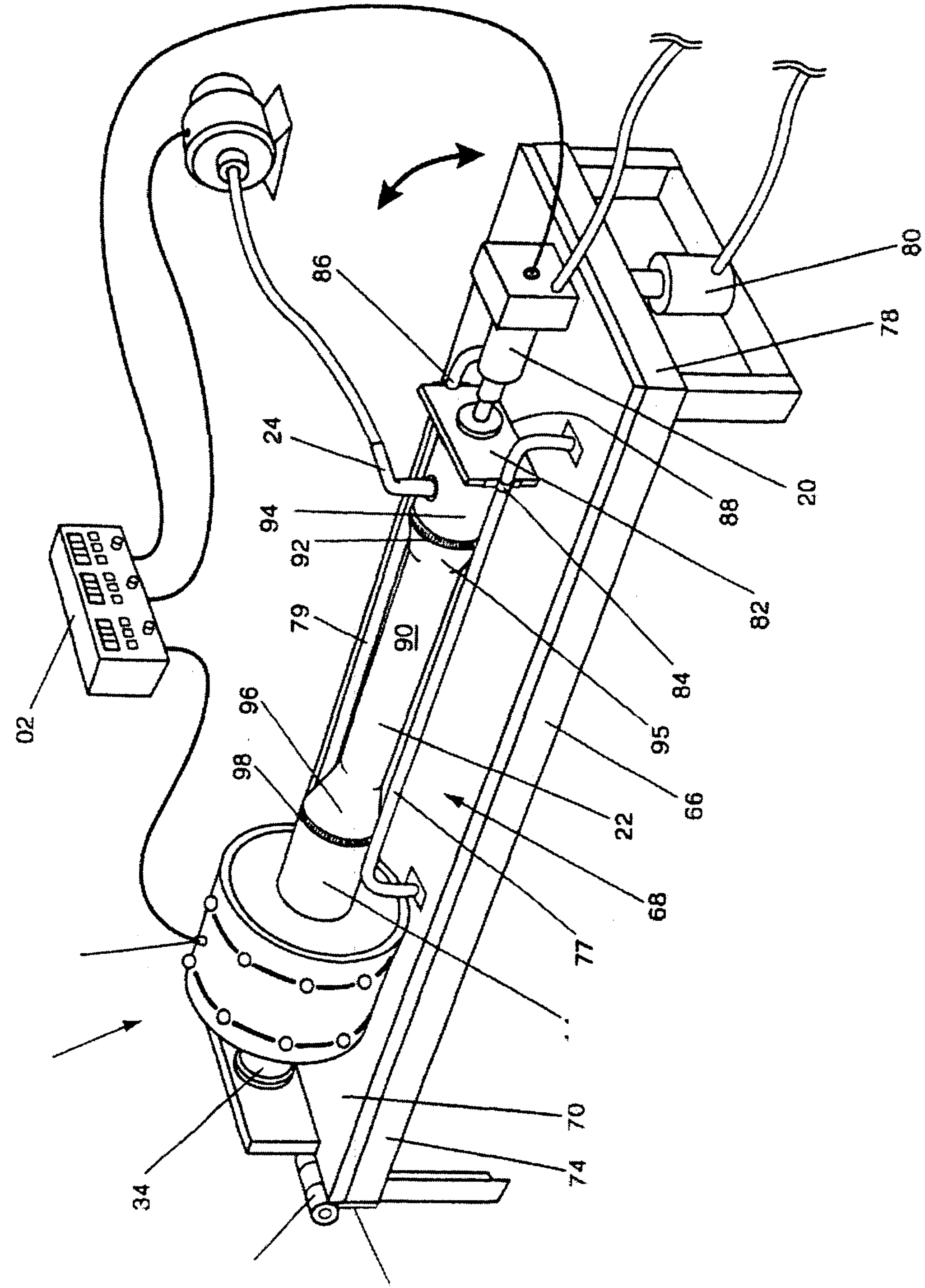


Fig.



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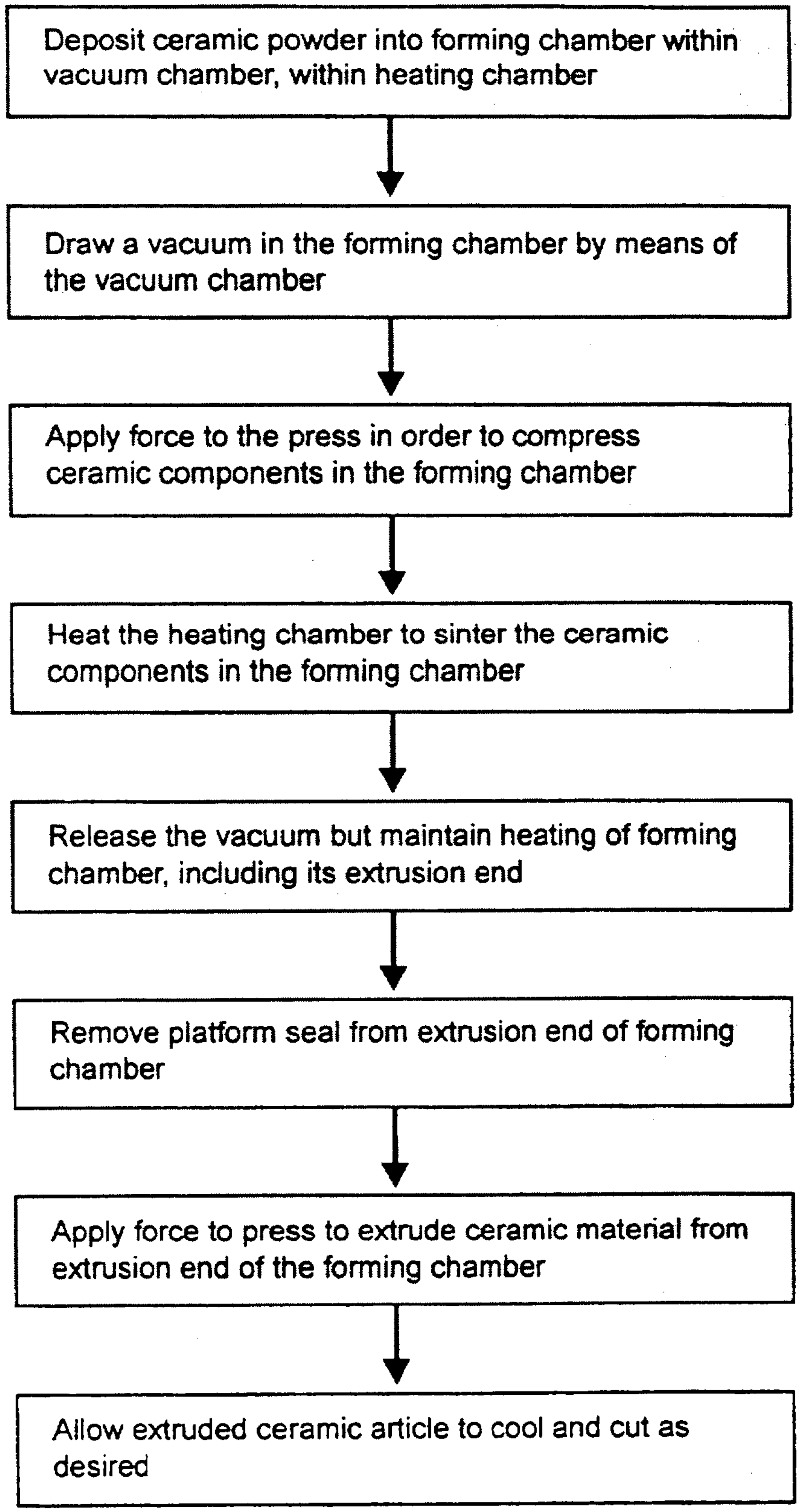
Deposit ceramic powder into forming chamber within vacuum chamber, within heating chamber
Draw a vacuum in the forming chamber by means of the vacuum chamber
Apply force to the press in order to compress ceramic components in the forming chamber
Heat the heating chamber to sinter the ceramic components in the forming chamber
Release the vacuum but maintain heating of forming chamber, including its extrusion end
Remove platform seal from extrusion end of forming chamber
Apply force to press to extrude ceramic material from extrusion end of the forming chamber
Allow extruded ceramic article to cool and cut as desired

Fig. 3

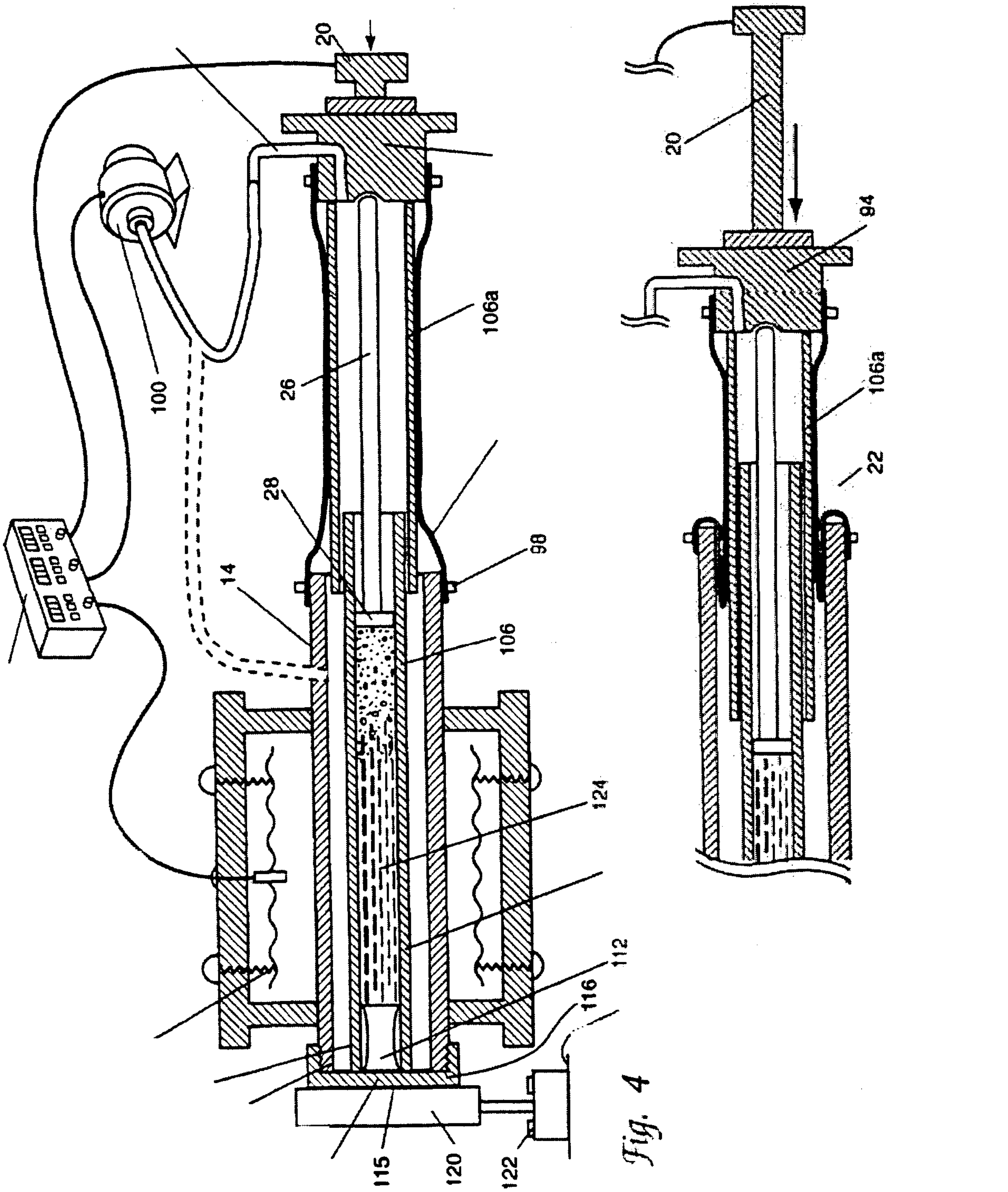

Fig. 4

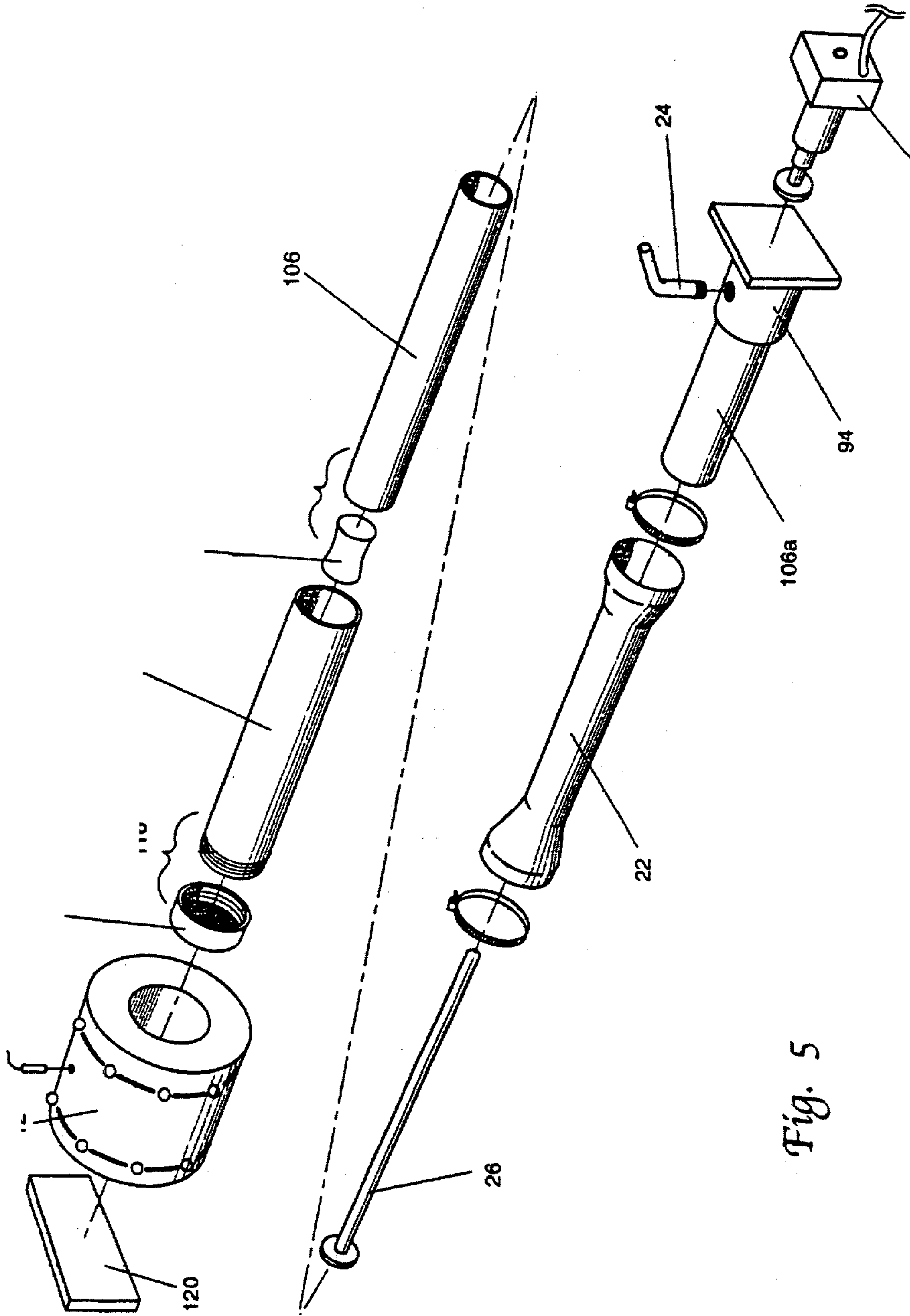

Fig. 5

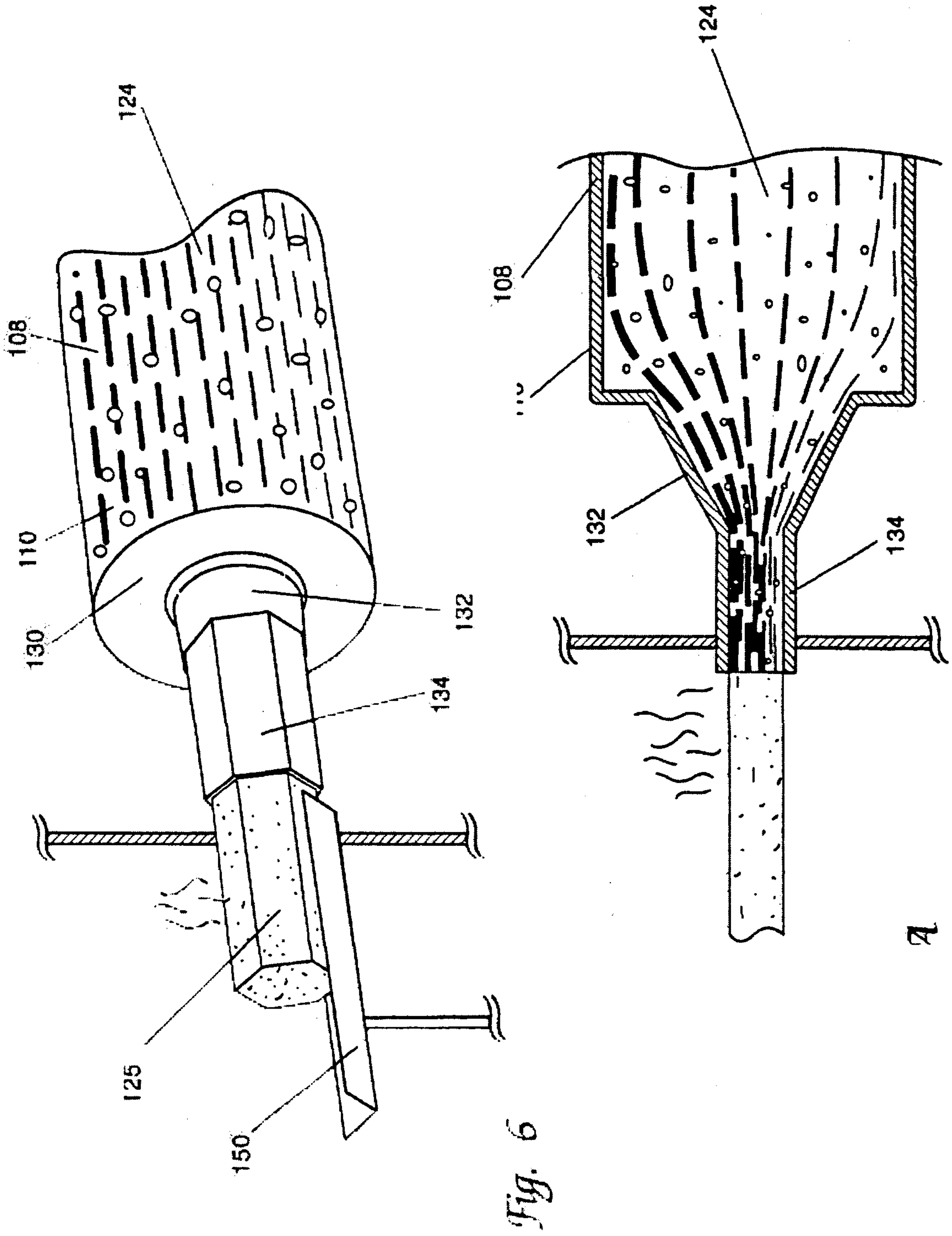

Fig. 6

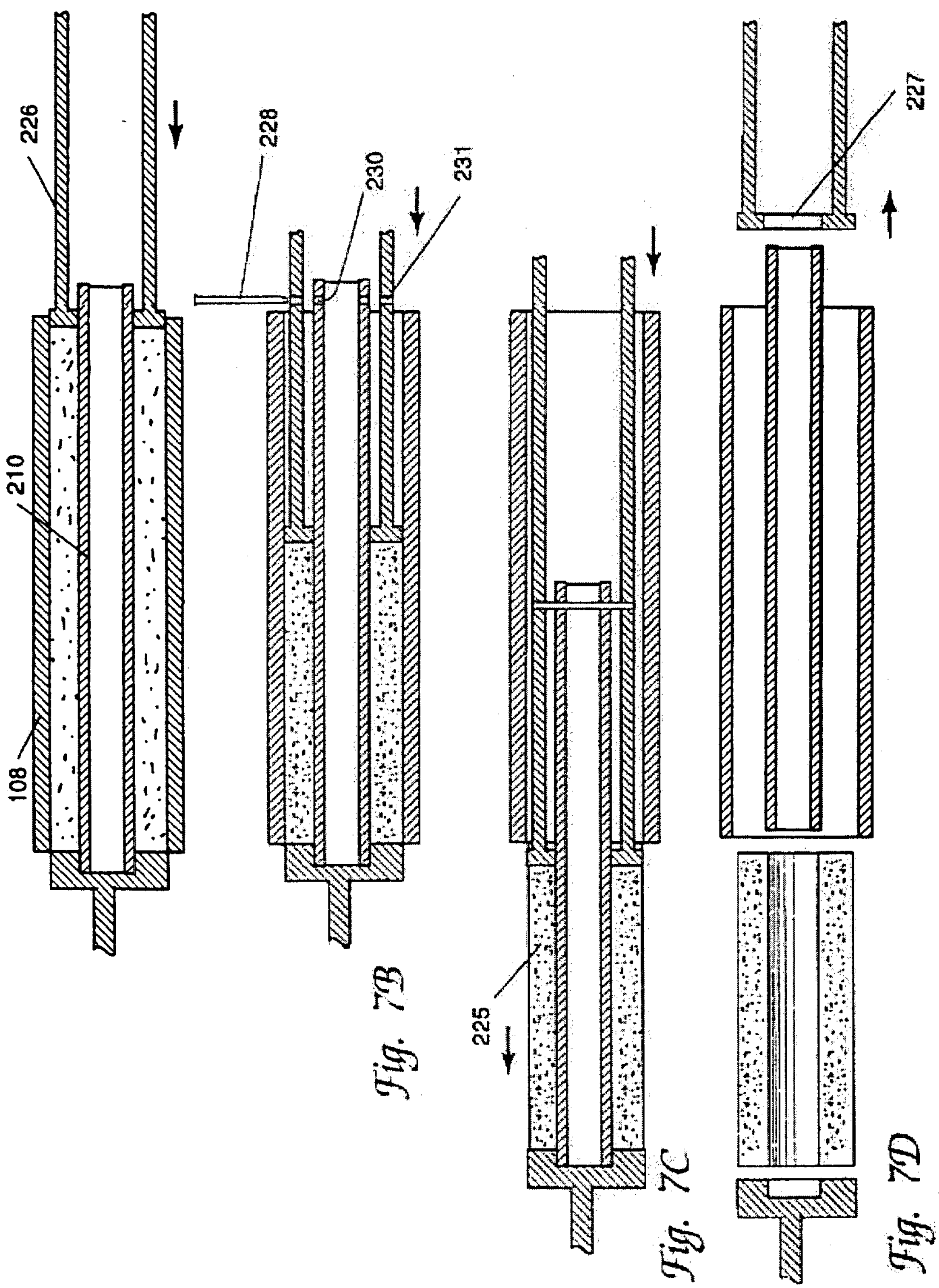

Fig. 7B

Fig. 7C

Fig. 7D

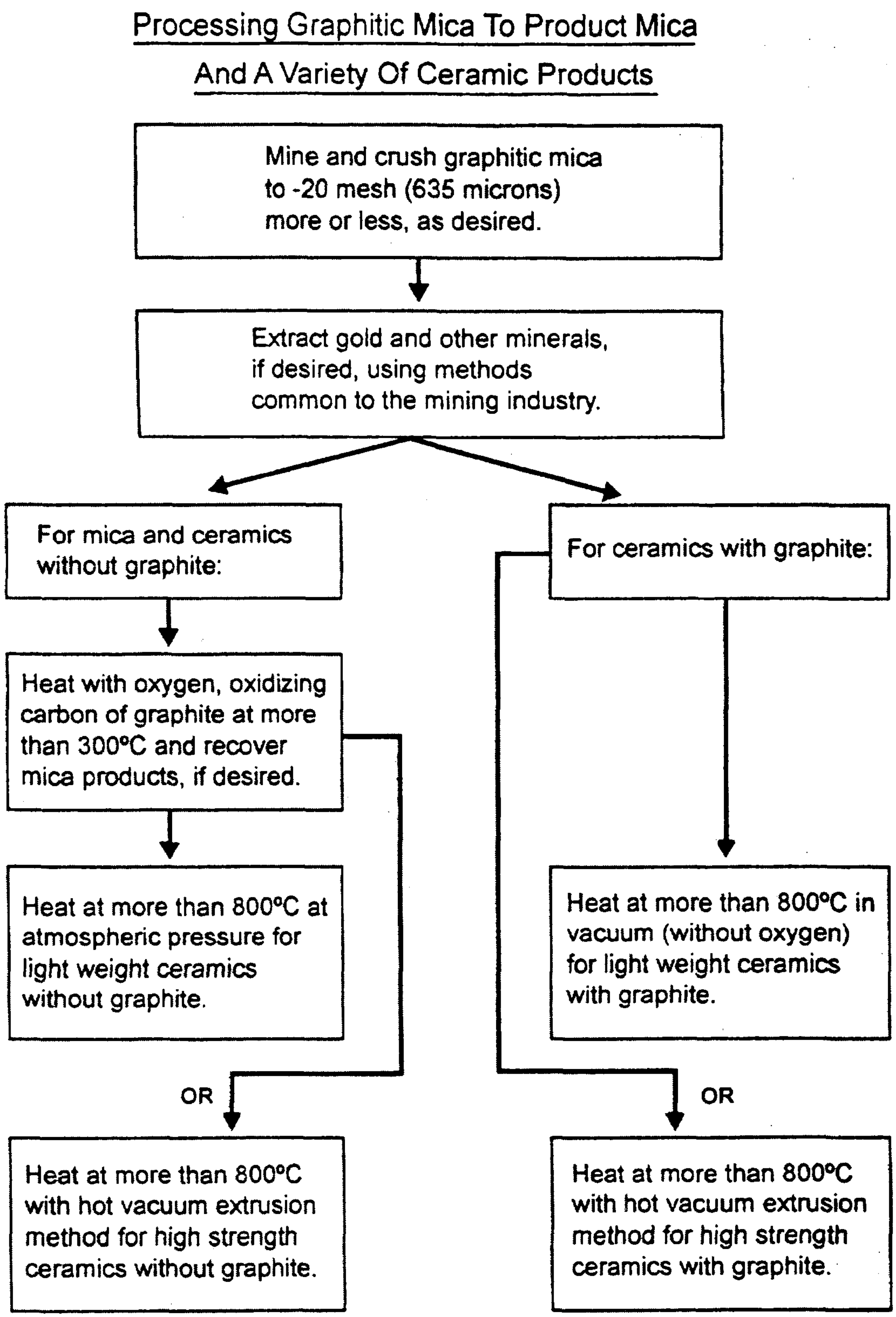
Processing Graphitic Mica To Product Mica
And A Variety Of Ceramic Products
Mine and crush graphitic mica to -20 mesh (635 microns) more or less, as desired.
Extract gold and other minerals, if desired, using methods common to the mining industry.
For mica and ceramics without graphite:
For ceramics with graphite:
Heat with oxygen, oxidizing carbon of graphite at more than 300°C and recover mica products, if desired.
Heat at more than 800°C at atmospheric pressure for light weight ceramics without graphite.
Heat at more than 800°C in vacuum (without oxygen) for light weight ceramics with graphite.
OR
OR
Heat at more than 800°C with hot vacuum extrusion method for high strength ceramics without graphite.
Heat at more than 800°C with hot vacuum extrusion method for high strength ceramics with graphite.

Fig. 8

APPARATUS FOR HOT VACUUM EXTRUSION OF CERAMICS

FIELD OF THE INVENTION

The present invention relates to a method and apparatus for manufacturing ceramic articles. More particularly, this invention relates to an improved method and apparatus for vacuum forming, compressing, heating, and extruding ceramic articles of manufacture.

BACKGROUND OF THE INVENTION

The ceramics manufacturing industry has long sought to develop more efficient and economical methods and apparatus for the manufacture of ceramic articles from ceramic components such as ceramic particles or powders, clay, etc. Examples of prior art in the field include the following U.S. Patents:

INVENTOR	ISSUE DATE	U.S. Pat. No.
Taylor	Apr. 18, 1933	1,904,568
Taylor	Jul. 11, 1933	1,918,064
Palmer	Jan. 21, 1936	2,028,240
Duncan	Jan. 7, 1947	2,414,029
Zambrow, et al.	Sep. 24, 1957	2,807,082
Dodds	Dec. 31, 1957	2,818,339
Deutsch	Sep. 1, 1959	2,902,364
Johnson	Sep. 8, 1959	2,902,714
Brennan	Dec. 13, 1960	2,964,400
Ellis, et al.	Jan. 10, 1961	2,967,613
Krapf	Aug. 4, 1964	3,143,413
Eyraud, et al.	Apr. 6, 1965	3,177,077
Roach	Jun. 28, 1966	3,258,514
Solomir, et al.	Oct. 11, 1966	3,278,301
Goosey	Jun. 11, 1974	3,816,586
McCauley	Aug. 6, 1974	3,827,892
Takahashi, et al.	Sep. 27, 1977	4,050,142
Fiorentino	Mar. 3, 1987	4,647,426
Kimrey, Jr.	Oct. 16, 1990	4,963,709
Corrigan	Aug. 27, 1991	5,043,120
Miyashita, et al.	Mar. 29, 1994	5,297,480

Many ceramic articles are produced by forming the articles from a wet plastic clay and then slowly heating the formed clay articles for hours or days. This process is cumbersome, time consuming, and costly.

The heating, or sintering, step involves the welding together and growth of contact area between two or more initially distinct particles at elevated temperatures (typically above one-half of, yet below, the melting point). It has long been known that sintering of ceramic powders is enhanced by compressing or compacting the ceramic powder. Compacting is generally done at room temperature, and the resulting compacted powder is subsequently sintered at elevated temperatures.

For example, the patent to Fiorentino teaches the production of billet and extruded products from particulate materials such as ceramics. In the Fiorentino patent, a method and apparatus is disclosed for consolidating particulate materials in press equipment utilizing a reusable canister sealed in a vacuum from the atmosphere and heated in the press equipment at elevated temperatures and pressures.

Use of such canisters, however, is expensive, time consuming, and labor intensive. The canister must be packed with ceramic powder, sealed and usually pressed in a vacuum, placed in an oven or furnace, then heated, and then opened to remove the article. The process thus requires a variety of steps that are labor intensive or require substantial automation equipment. The process is also time consuming.

Other prior art processes have been developed in order to compact or press the ceramic powders at elevated temperatures and therefore simultaneously press and heat the powder. See, e.g., McGraw-Hill, Encyclopedia of Science and Technology, pp.1764–65 (4^{th} Ed. 1998). Typically, however, these prior art hot pressing processes utilize an expensive, bulky vacuum housing or chamber containing the oven or furnace and pressing apparatus.

Another problem with such prior art processes is that they typically do not achieve the level of vitrification (glass bonding) of materials in the ceramic article being manufactured, particularly at the outer surface of the ceramic article being manufactured where enhanced vitrification is most desirable. Attaining such vitrification with the prior art methods such as hot pressing thus typically would require additional or extended heating of the article being hot pressed, which not only involves additional time and processing steps but also can conflict with the amount of time desired to attain the desired overall ceramic article properties achieved by the basic sintering process that takes place in the entire heating process.

The other prior art listed above but not specifically described further catalog the prior art of which the applicant is aware. These references diverge even more starkly from the references specifically distinguished above.

BRIEF SUMMARY OF THE INVENTION

The applicant has invented an apparatus and method forming ceramic articles from ceramic components, preferably ceramic powders. The method includes the following steps with the following apparatus: depositing ceramic components into a forming chamber mounted within a heating chamber; drawing a vacuum within and heating the forming chamber; opening an extrusion end of the ceramic forming chamber; and extruding the fused ceramic article through the extrusion end of the forming chamber.

Preferably, the method also includes pressing the ceramic components during the vacuum drawing and heating step. In addition, the heating chamber preferably continues to heat the forming chamber and its extrusion end during the extrusion step.

In a preferred embodiment, the vacuum is drawn by a vacuum chamber mounted within the heating chamber to surround the forming chamber. Also, the pressing step is preferably performed with a press mounted within a contractible bellows section of the vacuum chamber, and preferably the press is slidable within the forming chamber.

In a particularly preferred embodiment, the extrusion end of the forming chamber has a configuration and is heated sufficiently so that the periphery of the ceramic article is compressed and/or vitrified and/or further vitrified by the interaction of the ceramic article passing through the heated extrusion end. Most preferably, the forming chamber is not removed from the heating or vacuum chambers during the entire process.

There are other aspects and alternative or preferred embodiments of the invention. They will become apparent as the specification proceeds.

OBJECTS OF THE INVENTION

Accordingly, a primary object of the present invention is to provide a new and novel method and apparatus for hot vacuum extrusion of ceramics.

A further object of the present invention is to provide a device as characterized above which lends itself to mass production techniques.

Viewed from a first vantage point it is an object of the present invention to provide an apparatus for extrusion manufacturing ceramic articles from ceramic component materials, the a apparatus comprising in combination: a heating element; a vacuum chamber having an openable sealing member and being mounted adjacent the heating element whereby the heating element may heat the vacuum chamber; a ceramic forming chamber mounted adjacent the heat chamber and within the vacuum chamber, the ceramic forming chamber having an extrusion member; and a ceramic press movably penetrating ceramic extrusion chamber whereby ceramic component materials may be heated and pressed within the ceramic forming chamber and extruded out of the ceramic extrusion chamber through the extrusion member and the openable sealing member in the vacuum chamber.

Viewed from a second vantage point it is an object of the present invention to provide an apparatus for extrusion manufacturing ceramic articles from particulate ceramic components, the apparatus comprising in combination: a heating chamber; a vacuum chamber having being mounted within the heating chamber whereby the heating chamber may surround and heat a substantial portion of the vacuum chamber; a ceramic forming chamber having a press end opposite an extrusion end and an axial length spanning between the press end and the extrusion end, the ceramic extrusion chamber being mounted within and enclosed by the vacuum chamber so that the axial length of the ceramic forming chamber is surrounded by the heating element; and a ceramic press slidably penetrating the press end of the ceramic forming chamber whereby the particulate ceramic components may be heated and fused within the confines of the ceramic forming chamber and, after opening of the extrusion end of the ceramic forming chamber, extruded out of the ceramic forming chamber through the extrusion end and the vacuum chamber.

Viewed from a third vantage point it is an object of the present invention to provide a method of forming and extruding ceramic articles from ceramic component materials, the method comprising the steps of: depositing ceramic component materials in a ceramic forming chamber within a heating chamber; heating the ceramic forming chamber with the heating chamber and drawing a vacuum within the ceramic forming chamber in order to fuse and form the ceramic components materials; opening an extrusion end of the ceramic forming chamber without removing the ceramic forming chamber from the heating chamber; and extruding the fused and formed ceramic component materials through the extrusion end of the forming chamber.

Viewed from a fourth vantage point it is an object of the present invention to provide a method of heating, pressing, forming, and extruding ceramic articles of manufacture from ceramic components, the method comprising the steps of: depositing ceramic components into a forming chamber fixedly mounted within a vacuum chamber; drawing a vacuum within the vacuum chamber; pressing the ceramic components with a press slidably penetrating the forming chamber, and heating the vacuum chamber, the forming chamber, and the ceramic components with a heater assembly mounted externally to the vacuum chamber, whereby the ceramic components become fused within the forming chamber into a ceramic article; opening an extrusion end of the ceramic forming chamber while the forming chamber remains fixedly mounted within the vacuum chamber; extruding the fused ceramic article from the vacuum chamber by pressing the ceramic article with the sidable press so that the ceramic article extrudes through the extrusion end of the ceramic forming chamber.

These and other objects will be made manifest when considering the following detailed specification when taken in conjunction with the appended drawing figures. It is to be understood that the scope of the invention is to be determined by the claims and not by whether any given subject matter achieves all objects stated herein.

BRIEF DESCRIPTION OF THE DRAWINGS

The applicant's preferred method and apparatus are shown in the accompanying drawings wherein:

FIG. 1 is a cross-sectional schematic view of the applicant's preferred hot vacuum extrusion apparatus;

FIG. 2 is a perspective view of the applicant's preferred hot vacuum extrusion apparatus;

FIG. 3 is a flow chart of the applicant's preferred method for use with the applicant's preferred apparatus of FIGS. 1 and 2;

FIGS. 4 and 4*a* are cross-sectional views of the applicant's preferred hot vacuum extrusion apparatus shown in FIG. 2;

FIG. 5 is a partial exploded perspective view generally of components of the applicant's preferred hot vacuum extrusion apparatus of FIG. 4; and

FIGS. 6 and 6A are cross-sectional views of an alternative forming die for use with the present invention.

FIGS. 7A, 7B, 7C, and 7D are sectional views similar to FIG. 1 showing how hollow formed articles can be made.

FIG. 8 is a flow chart showing the processing graphitic mica to produce mica and a variety of ceramic products.

DESCRIPTION OF PREFERRED EMBODIMENTS

With reference now to FIG. 1, one embodiment of the applicant's preferred hot vacuum extrusion apparatus, generally 10, has an electric heating chamber or kiln having a heating element 12 surrounding a heating section 13 in a vacuum chamber 14, which in turn encompasses a forming chamber 16 and a slidable press 18 within the forming chamber 16. With reference to FIG. 1, the forming chamber 16 is centered and secured in position within the vacuum chamber 14 by metal spacers, e.g., 60, 62, mounted between the vacuum chamber 14 and forming chamber 16 at opposing ends of the forming chamber 16. Alternatively, the vacuum chamber 14 and the forming chamber 16 could be of one solid piece. The temperature of the heating chamber 12 is adjustable in a fashion such as described in connection with FIGS. 2 and 4 below.

A press or ram section 20 in the vacuum chamber 14 extends from the heating section 13. The press section 20 consists of a vacuum bellows section 22 in which the slidable press 18 is slidably mounted so that the press 18 and bellows section 22 can move in concert while maintaining a vacuum at desired level within the vacuum chamber 14 when drawn through the vacuum hose 24 by conventional vacuum drawing apparatus.

The press 18 has a press arm 26 connected to a transverse press face 28 that slidably penetrates and spans the width of, and slidably and sealingly abuts, the interior 30 of the pressing end 32 of the forming chamber 16. The slidable press or ram 18 is driven by a conventional press drive so that pressure applied by the press **18** on the ceramic contents of the forming chamber **16** can be adjusted and maintained as desired.

The forming chamber **16** has a fixed extrusion end or tool **34** opposite the pressing end **32**. The extrusion end **34** is removable and replaceable and has an extrusion aperture (not shown) having any of a number of desired shapes for the article to be extruded through the aperture. The aperture is sealed when desired by a platform seal **36** that abuts the external face of the extrusion end **34**. The platform seal **36** is removably secured in position by a clamp **38** attached to the platform seal **36**. The clamp **38** may, for example, be threaded onto the external periphery **40** of the vacuum chamber or housing **14** in order to sealingly secure the platform seal **36** against the extrusion end **34** when desired (such as prior to the ceramic article extrusion step described below).

The heating chamber or element **12** is surrounded on its external periphery **42** by conventional insulating material **44**. The interior periphery **46** of the heating chamber **12** is also spaced from the external periphery **40** of the vacuum chamber **14** by insulation spacers, e.g., **50**, **52**, mounted at opposing ends of the heating chamber **12**.

Preferably, the press arm **26** is tubular and the press face **28** includes an aperture (not shown) so that ceramic components (such as ceramic powders) **54** may be deposited into the forming chamber **16** through the tubular press arm **26** and aperture extending through the press face **28** into the interior **56** of the forming chamber **16**. The aperture in the press face **28** may be closed or sealed so that the press face **28** presents a unitary pressing surface toward the ceramic components **54** within the forming chamber **16**. This closure or sealing of the press face may by accomplished by, for example, rotating one portion of the press face **28** with respect to another portion of the press face **28** secured in position by interaction of the press face **28** with the interior **30** of the forming chamber **16**.

Alternatively, the press arm **26** and press face **28** may be comprised of solid and rigid components. In this embodiment, the ceramic components **54** may be deposited within the forming chamber **16** through the extrusion end **34** by loosening and tightening of the clamp **38** sufficient to allow loosening and removal and replacement of the platform seal **36** as desired to make the deposit into the forming chamber **16**.

The press **18**, vacuum chamber **14**, forming chamber **16**, sealing platform **36**, clamp **38**, and forming chamber spacers **60**, **62** are preferably made of iron, stainless steel, or other high temperature alloys. Spacers **60**, **62** may be located anywhere along the length between chambers **14** and **16** or at one end, cantilevering chamber **16**, as shown. The bellows section **22**, however, also includes sealed joints, e.g., **64**, having seals made of flexible, resilient materials sufficient to provide the flexibility required at the joints **64** while maintaining the desired seal at the joints **64**.

The ceramic components **54** to be deposited into the forming chamber **16** are preferably of the type that are ductile at high temperatures and pressures, such as muscovite mica and certain clays that reach adequate vitrification (when desired) at the temperatures and pressures used. In the case of certain gold bearing muscovite mica schists, the gold is preferably first extracted by commonly used methods such as by screening, gravity extraction, cyanide extraction, or other common methods without otherwise significantly changing the composition of the mica. In this regard, the mica or clay may contain a significant amount of other minerals, even as much as 40% or more, and still make a desirable ceramic product with the present apparatus and method.

With reference now to FIG. **2**, an alternative preferred embodiment, generally **11**, includes a floor stand **66** on which the extrusion apparatus, generally **68**, is mounted. The floor stand **66** has an upper table **70** rotatably secured by means of a hinge **72** to a lower rigid supporting platform **74** at the hinged end **76** of the floor stand **66** adjacent the extrusion end or tool **34** on the extrusion apparatus **68**. At the opposing end **78** of the floor stand **66**, the upper table **70** rests on the lower support platform **74** but is also rotatable at that end upward, about the hinge **72**, when raised by means of a hydraulic lift **80** when the lift **80** is actuated by an operator. The lift **80** allows substantially vertical orientation as suggested in FIG. **1** in order to easily load in ceramic components **54**, and/or, more importantly, to extrude the ceramic components **54** at any angle from horizontal to vertical.

The extrusion apparatus **68** of the alternative FIG. **2** embodiment includes two generally parallel press guide bars **77**, **79** rigidly mounted on the upper surface of the upper table **70**. The guide bars **77**, **79** are mounted on opposing sides of, and parallel to, the axis of the ram **20** and bellows **22**.

A rectangular steel press guide plate **82** is mounted transverse to the axis of the bellows **22** and the hydraulically driven ram **20**. The guide plate **82** is secured to the ram **20** and has two guide apertures **84**, **86** on opposing sides, and the guide bars **77**, **79** penetrate the guide apertures **84**, **86** respectively. The lower planar side **88** of the guide plate **82** sidably abuts the upper surface of the upper table **70**. When the ram **20** is actuated toward or away from the heating chamber or kiln **12**, the guide plate **82** thus slides along and parallel to both the guide rails **77**, **79** and the upper surface of the upper table **70**. This novel and economical cooperative arrangement of guide rails **77**, **79**, upper table **70**, and guide plate **82** retains the press arm (**26** in FIG. **4**) in the proper axial alignment during operation of the extrusion apparatus **68**.

In the alternative embodiment of FIG. **2**, the external, expandable and contractible outer surface **90** of the bellows **22** is made of rubber or other flexible but relatively nonporous material. One end **95** of the bellows **22** is secured by a peripheral clamp **92** to the outer periphery of a steel support cylinder **94** coaxial with the bellows **22** and extending perpendicularly from, and welded to, the guide plate **82** toward the vacuum chamber **14**. The opposing end **96** of the bellows **22** is secured by a peripheral clamp **98** to the outer periphery of the cylindrical vacuum chamber **14**.

FIGS. **4** and **4A** show the bellows **22** in extremes of travel. An elastomeric tube **22** may be bonded and clamped to vacuum chamber **14** and cylinder **94** at extremities of tube **22**, although its elasticity alone can provide an adequate seal when carefully chosen. Inner pipe **106** is fixed with respect to cylinder **94**. Pipe **106** overlies press face **28**. Vacuum suction tends to hold the tube **22** to the inner pipe **106**. The tube **22** tends to fold over itself as the press arm **26** advances into pipe **106**. FIGS. **4**, **4a** and **5** show an optional sleeve **106a** supported by cylinder **94**. Sleeve clears and slides between chambers **14** and **106**.

Referring again to FIG. **4**, a vacuum pump **100** is connected to the vacuum line **24**, and the vacuum line **24** penetrates the steel support cylinder **94**. When activated by an operator, the vacuum pump **100** thus draws a vacuum within the interior of the bellows **22** and the interior of the vacuum chamber 14 to which the bellows 22 is sealingly secured by the clamp 98. Shown in phantom in FIG. 4, the vacuum pump 100 can alternatively lead to a vacuum line 24 located directly to vacuum chamber 14.

The vacuum pump 100, the heating element 12, and the hydraulic ram 20 are connected to and controlled by their respective set of controls mounted in a central control box 102. An operator standing at the control box 102 can thus control the temperature of the element 12, the drawing of the vacuum by the vacuum pump 100, and the pressing or withdrawal of the press 26 by the hydraulic ram 20.

Still referring to FIG. 4, the bellows 22 surround the press arm 26, and the press arm 26 slidably penetrates the feed end 106 of the forming chamber 108 within the interior of the vacuum chamber 14. As shown in FIGS. 4 and 5, the press 20 and bellows 22 are coaxial with the axis of the forming chamber 108, the surrounding cylindrical vacuum chamber 14, and the surrounding cylindrical kiln and heating element 12.

Referring to FIG. 4, at the forming end 110 of the forming chamber 108 opposite the feed end 106, a steel forming plug 112 is removably and slidably mounted within the interior of the forming chamber 108, and the forming end 110 and forming plug 112 both abut a removable rear vacuum seal 114 removably threaded into threads 116 formed in the ejection end 108 of the vacuum chamber 14. In turn, the opposing outward side 115 of the seal 114 abuts a rigid steel stop block 120 removably secured by fasteners, e.g., 122, to the upper table 70. Thus, when materials 124 are being pressed, heated, and formed within the forming chamber 108, the plug 112 is secured in position within the forming chamber; and when the stop block 120, seal 114, and plug 112 are removed after the pressing and heating of the materials 124 within the forming chamber 108, the press arm may be hydraulically activated by the operator to press the materials 124 axially through the forming chamber 106 and out the forming end 110 of the forming chamber 108.

Referring now to FIGS. 6 and 6A, during the extrusion operation, a forming die 130 may be removably mounted on the forming end 110 of the forming chamber 108. The forming die 130 may have a narrowed conical neck section 132 terminating in a yet narrower forming section 134 in the die 130. The structure of the forming die 130 will provide friction and other resistance to the passage of forming material 124 through the die 130; and the die 130 will simultaneously further compress the forming material 124 as it passes through the die 130. Since the portion of the die 130 abutting the forming chamber 108 is somewhat heated by the surrounding kiln due to element 12 as shown in FIG. 2 and compresses and creates friction with the forming material 124 as it passes through the die 130, and forming section 134, the die 130 and especially forming section 134 aids in vitrification of the outer surface of the material 124 as the material 124 passes through the die 130 and forming section 134. Finally, the forming section 134 of the die 130 may be sized (i.e., has a sufficient axial length) so that material 124 being ejected outward of the forming section 134 begins to cool prior to contact with the cooler air outward of the die 130 and forming chamber 108 within the kiln as shown in FIG. 2. As shown in FIGS. 6, the ejected and formed material 125 is preferably supported by a guide tray 150 placed in position outboard of, but adjacent, the forming chamber 108 prior to ejection of the material 125 from the forming chamber 108.

A hollow formed material 225 can be made by using a forming tube 210 in the center of chamber 108, as shown in FIGS. 7A–7D. Press arm 226 has a central hollow 227 to clear around tube 210 and push material 225. The tube 210 locks to arm 226 via a pin 228 passing through holes 231 in arm 226 and holes 230 in tube 210 to extract tube 210.

With reference now to FIG. 3, the preferred method proceeds as follows:

A. in the fashion described above, deposit the ceramic components into the forming chamber, with the extrusion end pre-sealed by the platform seal abutting the extrusion end:

B. draw a vacuum in the forming chamber by means of the vacuum chamber surrounding the forming chamber;

C. while maintaining the vacuum, apply force to the press (such as by activating the hydraulic ram 20 of FIG. 2) in order to force the press face to against the deposited ceramic components and compress the components within the forming chamber;

D. while maintaining the vacuum and pressing force, heat the heating chamber in order to: (i) achieve the temperature required in the forming chamber and thereby fuse or sinter the ceramic components; and (ii) heat the extrusion end of the chamber to the desired temperature to accomplish the desired vitrification, or further vitrification, of the ceramic material when later extruded through the extrusion end;

E. release the vacuum;

F. release the clamp so that the platform seal can be removed from the extrusion end of the forming chamber;

G. with the forming chamber remaining in position within the vacuum chamber, apply further force to the press so that the press face presses the sintered ceramic material to extrude through the extrusion end and thus attain the desired shape and, if desired, vitrification or further vitrification of the external surface of the ceramic material that comes into contact with the extrusion end during this extrusion step;

H. allow the extruded ceramic material to cool, and if desired, cut into smaller sections in a manner well known to those skilled in the art.

When the ceramic component material is muscovite mica, the heating temperature utilized in the preferred method may be as high as 1250–1320 degrees Celsius. The application of the vacuum prior to fusing of the mica by heating renders the resulting product significantly less porous and stronger; and the application of pressure by the press renders the resulting product even more solid, impermeable, and strong. In addition, the utilization of the vacuum and the press in the present method allows for use of lower temperatures to achieve the desired sintering, structural integrity, and strength of the resulting ceramic product.

In this regard, the maintenance of the vacuum during the heating step can also reduce the amount of oxidation of minerals (such as graphite) within the mica matrix and can increase the variety or level of crystallization in the resulting product (such as by crystallization of silicon carbide within the sintered mica). The resulting ceramic product is therefore harder and stronger and has a higher fusing point. Additionally, under a vacuum, varying the degree of heat and ram pressure during the process with graphite present, can significantly alter the final product, as needed, in regard to its magnetic and electrical properties. There exists throughout the world sizable natural bodies of graphitic mica, also known as graphitic schist. These rocks generally consist of a few percent of graphite within the matrixes of fine grained (generally muscovite) mica and have had no significant economic uses. Efforts to separate the potentially valuable mica from the graphite have been unsuccessful. However, the claimant has discovered processes to economically use the graphitic mica, as shown in FIG. 8. The graphitic mica material is first crushed, then when it is heated to above 300 degrees C. with air, any graphite will start to oxidize, and prior to the complete destruction of mica, will produce various grades of economical graphite-free mica. When the muscovite mica is heated to 400–500 degrees C., the crystalline structure starts to change, and then evolves water at 500–700 degrees C., and at 940–1200 degrees C., it changes to alumina, mullite, and a glass and which can fuse into a valuable ceramic, even without pressure. At about 1250–1320 degrees C., (or at lower temperatures with the hot vacuum extrusion method), the mica ceramic product will fuse into an impermeable state presenting a more valuable ceramic with increased strength. Mica minerals with graphite, other than muscovite mica, can be processed in the same manner, but at generally higher temperatures.

When the graphitic mica is heated, as in the above paragraph, but in a vacuum or in an atmosphere without oxygen, the resulting ceramic will retain the graphite in various forms (in the matrix of the ceramic product) including graphite, silicon carbide, and other crystal forms, and will develop magnetic and electrical properties. This process gives the product added hardness and strength, with a higher fusing point. Additionally, if the foregoing is accomplished with a ram pressure (with the hot vacuum extrusion method), the ceramic will become impermeable and much stronger, even at lower temperatures.

The ceramic products processed from graphitic mica (which previously had no significant value), as described above, can be made into a wide variety of ceramic products including bricks, roofing tiles, floor tiles, bearing walls, and pipes. In addition to the ceramic products described above, when made in a vacuum or in an atmosphere without oxygen, the graphitic mica can be made into grinding tools, cutting and scraping tools, and when subjected to the vacuum hot press extrusion method, it produces high strength ceramics, and achieves degrees of magnetic and electrical conductivity which allows it to replace heavier more expensive metals having a variety of well known useful magnetic and electrical properties. As described above, if the graphite is oxidized, prior to fusing the resulting graphite-free mica, the mica product can be economically used as a filler and extender in gypsum plasterboard cements, as a pigment extender in paints, as a filler in the plastics and tire industries, as well as other uses where ground mica is commonly used.

As also noted above, when the heated ceramic material is extruded through the hot extrusion end, the surface of the sintered ceramic material can be vitrified, or further vitrified, in order to achieve an attractive, harder, and highly impermeable glaze-like surface on the extruded ceramic product.

It can thus be seen that the applicant's preferred embodiment, provides a unique and streamlined method and apparatus for hot manufacturing and hot extrusion of ceramic articles under pressure. The applicant's most preferred method and apparatus do not require removal or opening of canisters or other containers used to pack or form the ceramic components that are formed into ceramic articles of manufacture. The most preferred method and apparatus also require no clamping or dismantling of any mold. They accomplish pressing of the entire ceramic article being heated within the apparatus, and they do not require use of binding agents or wet plastic clay. They can enhance vitrification of the outer surface of the ceramic article being manufactured; and they render the resulting ceramic article denser, stronger, more homogenous, and economical. They also make removal of the sintered ceramic article relatively easy, through the internal extrusion process.

The foregoing is a detailed description of the applicant's preferred embodiment. The scope of the present invention, however, is to be determined by reference to the accompanying claims.

Moreover, having thus described the invention, it should be apparent that numerous structural modifications and adaptations may be resorted to without departing from the scope and fair meaning of the instant invention as set forth hereinabove and as described hereinbelow by the claims.

I claim:

1. An apparatus for extrusion manufacturing ceramic articles from ceramic component materials, the apparatus comprising in combination:

(A) a heating element;

(B) a vacuum chamber being mounted adjacent the heating element whereby the heating element heats at least a portion of the vacuum chamber;

(C) a ceramic forming chamber portion located within the vacuum chamber portion, the ceramic forming chamber having an extrusion member; and

(D) a ceramic press movably penetrating the ceramic forming chamber portion whereby ceramic component materials are heated and pressed within the ceramic forming chamber portion and extruded out of the ceramic forming chamber portion through the extrusion member wherein (i) the ceramic forming chamber portion has a press aperture, (ii) the vacuum chamber has a bellows section opposite an openable sealing member and formed from flexible, non-porous material, and (iii) the ceramic press has a press arm mounted within the bellows section to slidably move within the bellows section and penetrate the press aperture, to thereby press the ceramic component materials within the ceramic forming chamber portion.

2. The ceramic manufacturing apparatus of claim 1 also having a press platform removably mountable within the confines of the vacuum chamber in order to seal and support the extrusion member during pressing and pre-extrusion heating of the ceramic components materials within the ceramic forming chamber portion.

3. The ceramic manufacturing apparatus of claim 1 in which the bellows section is mounted adjacent a press end of the ceramic forming chamber portion and the apparatus also has a press platform removably mountable opposite the press end of the ceramic forming chamber portion and within the confines of the vacuum chamber in order to seal and support the extrusion member during pressing and pre-extrusion heating of the ceramic components materials within the ceramic forming chamber portion.

4. An apparatus for extrusion manufacturing ceramic articles from particulate ceramic components, the apparatus comprising in combination:

(A) a heating chamber;

(B) a vacuum chamber having a first end mounted within the heating chamber whereby the heating chamber surrounds and heats a substantial portion of the vacuum chamber;

(C) a ceramic forming chamber having a press end opposite an extrusion end and an axial length spanning between the press end and the extrusion end, the ceramic forming chamber being mounted within and enclosed by the vacuum chamber so that the axial length of the ceramic forming chamber is substantially surrounded by the heating chamber; and

(D) a ceramic press slidably penetrating the press end of the ceramic forming chamber whereby the particulate ceramic components are heated and fused within the confines of the ceramic forming chamber and extruded out of the ceramic forming chamber through the extrusion end and the vacuum chamber.

5. The ceramic manufacturing apparatus of claim 4 wherein (i) the ceramic forming chamber has a press aperture penetrating the press end of the ceramic forming chamber, (ii) the vacuum chamber has a bellows section, and (iii) the ceramic press has a press arm mounted within the bellows section to slidably move within the bellows section and penetrate the press aperture, to thereby press and form the particulate ceramic components within the ceramic forming chamber.

6. The ceramic manufacturing apparatus of claim 5 also having a press platform removably mounted within the confines of the vacuum chamber in order to seal and support the extrusion end of the ceramic forming chamber during pressing and pre-extrusion heating of the particulate ceramic components within the ceramic forming chamber.

7. The ceramic manufacturing apparatus of claim 6 also having a press platform removably mountable opposite the press end of the ceramic forming chamber and within the confines of the vacuum chamber in order to seal and support the extrusion end during pressing and pre-extrusion heating of the particulate ceramic components within the ceramic forming chamber.

8. The ceramic manufacturing apparatus of claim 1 wherein (i) the ceramic forming chamber portion has a press aperture, (ii) the vacuum chamber has an elastomeric tube section opposite an openable sealing member and defining said bellows section, and (iii) the ceramic press has a press arm mounted within the elastomeric tube section to slidably move within the elastomeric tube section and penetrate the press aperture, to thereby press the ceramic component materials within the ceramic forming chamber portion, said elastomeric tube section folds and unfolds over itself as the press arm moves.

9. An apparatus for extrusion manufacturing ceramic articles from particulate ceramic components, the apparatus comprising, in combination:

a heating chamber;

means for retarding oxidation of the ceramic component material;

a ceramic forming chamber having a press end and an extrusion end, said ceramic forming chamber disposed within said heating chamber such that said press end extends out from said heating chamber and said oxidation retarding means couples to said press end; and

a press slidably penetrating the press end of the ceramic forming chamber whereby the particulate ceramic components are heated and fused within the confines of the ceramic forming chamber and extruded out of the ceramic forming chamber through the extrusion end of the ceramic forming chamber, said press having an extremity remote from said press end coupled to said oxidation retarding means.

10. The apparatus of claim 1 wherein said bellows section is formed from rubber.

11. The apparatus of claim 9 wherein said oxidation retarding means compress a resilient elastomeric sleeve sealed to said press end and sealed to said press at said remote extremity.

12. The apparatus of claim 11 wherein said sleeve has an interior which receives a vacuum to retard oxidation and said sleeve folds and unfolds over itself during motion of said press.

* * * * *

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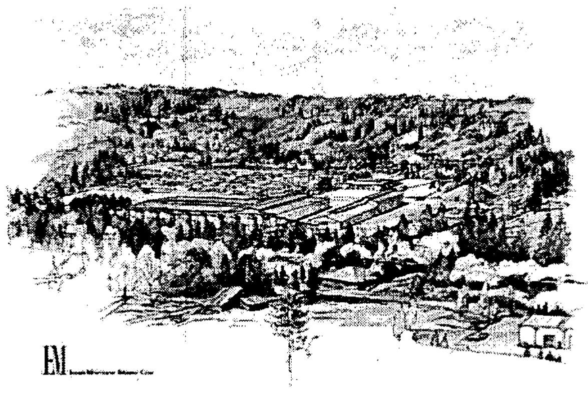
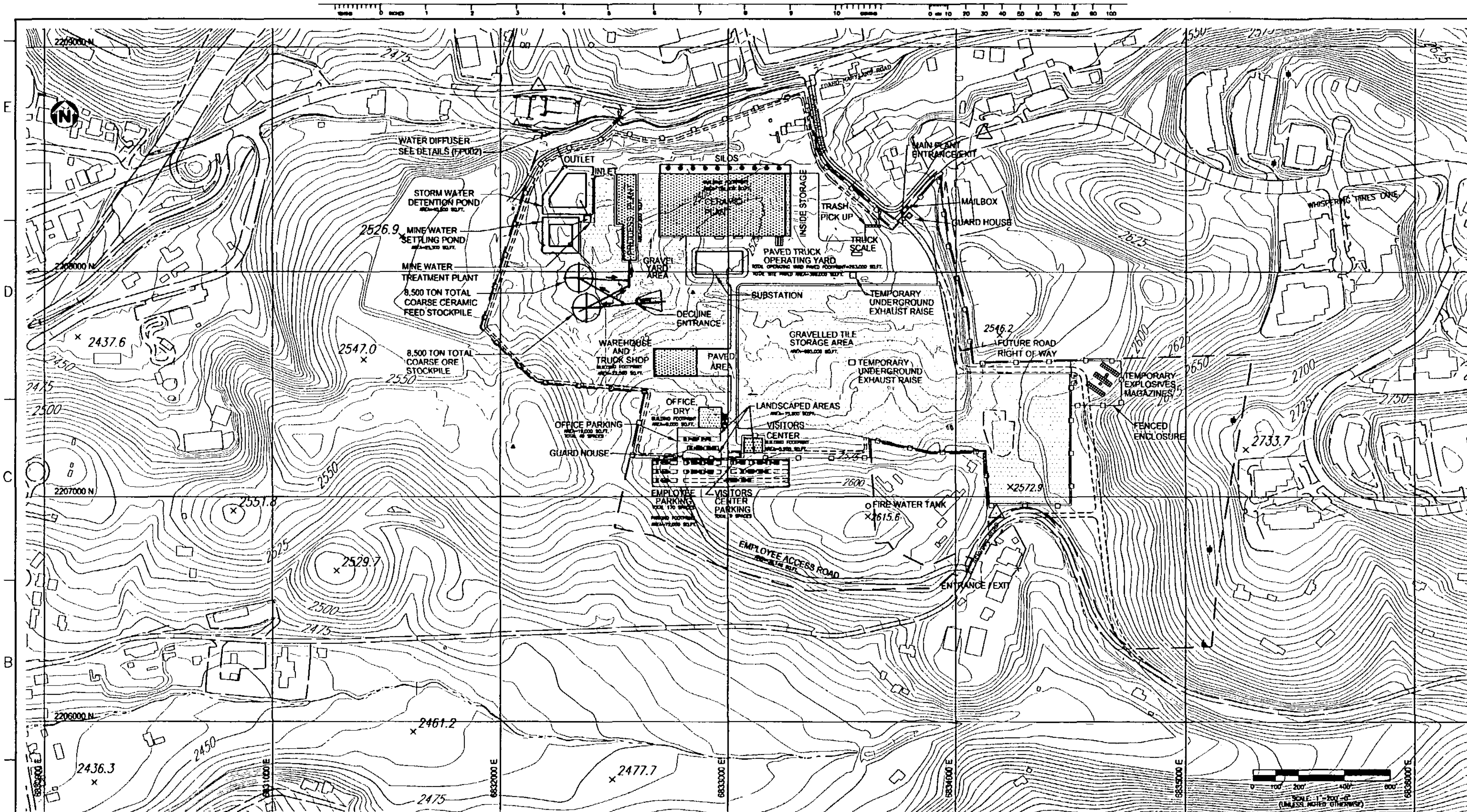
Appendix B



Site Plan

amec



REV	D/M/Y	REVISION	DRN	CHK	APP	APP	APP	APP	ISS	D/M/Y	APP
E	17/11/04	ISSUED FOR PERMITTING									

ISSUED FOR	REF	NUMBER	TITLE
			REFERENCES

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CLIENT PROJECT MGR. DEPARTMENT MGR. PROJECT MGR.

PROJECT PHASE

PROJECT NO. | ACTIVITY NO. | PACKAGE CODE

SCALE 1"=200'

DRN. E.BRISBANE 17/10/04
DSN. E.BRISBANE 17/10/04
BY D/M/Y

amec

AREA

SUBJECT
CONCEPTUAL SITE PLAN
IDAHO-MARY LAND SITE

IDAHO-MARYLAND MINING CORPORATION

IDAHO-MARYLAND MINE

DRAWING NO. 100-C-0005 REV. E

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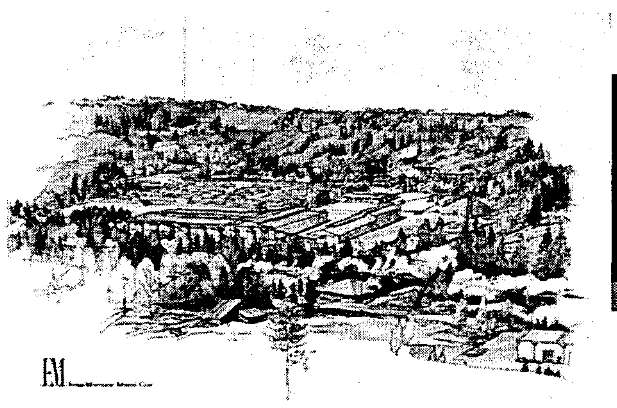
8 7 6 5 4 3 2 1

Idaho-Maryland Mining Corporation

Appendix C



Geochemistry

amec

CERAMICS RESOURCE GEOCHEMISTRY DATABASE

MODIFIED FROM: CERAMEXT ASSAY DATA BASE

Project: IDAHO-MARYLAND MINING CORP.

Sept. 29, 2004

By B. Pease

Sample No.	Rock Type	Sample Type	Assay Type	Lab	Date	Al2O3	BaO	CaO, %	C, Total	C, Organic	C, Inorg	Cr2O3%	Fe2O3%	K2O%	MgO	MnO%	Na2O%	P2O5%	S, total	SiO2%	TiO2%	LOI
CX-1027	Serpentine, alt	Surface	Whole Rock	KCA-Florin	04/20/2004	2.11		4.32				0.27	6.6	-0.1	28.78	0.09	0.07	0.04		32.53	0.04	21.82
CX-1028	Serpentine	Surface	Whole Rock	KCA-Florin	04/20/2004	0.74		0.43	0.2	-0.01	0.21	0.3	7.63	-0.1	38.32	0.1	-0.05	0.04	0.1	37.71	0.01	12.64
CX-1029	Andesite Breccia	Surface	Whole Rock	KCA-Florin	04/20/2004	16.22		6.66	0.07	0.01	0.06	0.02	7.3	0.67	5.37	0.1	3.55	0.2	0.1	55.63	0.72	2.91
CX-1030	Diabase	Surface	Whole Rock	KCA-Florin	04/20/2004	16.67		3.34	1.19	0.13	1.06	0.01	9.03	0.79	5.82	0.14	5.81	0.18	0.78	48.84	0.79	7.04
CX-1034.1	Andesite Breccia	Surface	Whole Rock	KCA-Florin	06/03/2004	17.7	0.06	6.17	0.03	0.02	0.01	0.01	8.29	0.87	5.07	0.13	3.4	0.17	0.2	53.62	0.82	1.38
CX-1034.2	Andesite Breccia	Surface	Whole Rock	KCA-Florin	06/03/2004	16.91	0.06	6.11				0.01	8.28	0.85	5.01	0.13	3.31	0.17		54.38	0.8	1.82
CX-1036	Andesite Intrusive	Surface	Whole Rock	KCA-Florin	07/29/2004	15.02	-0.001	6.14	0.2	0.2	0	0.06	10.08	0.1	8.07	0.17	3.72	0.11	0.03	48.44	0.98	5.82
CX-1037	Andesite Flow	Surface	Whole Rock	KCA-Florin	07/29/2004	16.06	-0.01	8.72	0.62	0.15	0.47	0.04	10.46	0.41	8.05	0.16	4.15	0.14	0.11	46.1	1.01	5.18
CX-1038	Andesite Flow	Surface	Whole Rock	KCA-Florin	07/29/2004	15.4	0.01	6.3	0.14	0.06	0.08	0.03	11.72	0.37	8.82	0.23	3.82	0.18	0.15	48.58	1.09	3.25
CX-1039	Andesite Flow	Surface	Whole Rock	KCA-Florin	07/29/2004	16.14	0.01	7.08	0.12	0.08	0.04	0.03	11.02	0.34	8.44	0.15	3.6	0.13	0.03	48.22	1.06	3.59
CX-1040	Dacite Intrusive	Surface	Whole Rock	KCA-Florin	07/29/2004	16.43	0.02	1.71	0.06	0.04	0.02	0.01	5.28	0.76	2.32	0.1	6.19	0.17	0.01	64.19	0.3	1.59
CX-1041	Andesite Flow	Surface	Whole Rock	KCA-Florin	07/29/2004	14.76	-0.01	6.73	0.14	0.07	0.07	0.03	10.58	0.19	9.01	0.2	4.15	0.11	0.02	50.04	1.06	2.85
CX1042	Andesite Flow	IDH032, 125-135 ft.	Extrusion	I-M																		
CX-1043	Andesite Flow	IDH032, 135-145 ft.	Whole Rock	KCA-Florin	07/29/2004	15.52	-0.01	8.68	0.26	0.04	0.22	0.05	9.86	0.27	9.18	0.15	3.46	0.13	0.07	47.25	1.07	4.03
CX1044	Andesite Intrusive	IDH032, 671-681 ft.	Extrusion																			
CX-1045	Andesite Intrusive	IDH032, 681-691ft.	Whole Rock	KCA-Florin	07/29/2004	14.68	-0.01	8.24	0.48	-0.01	0.49	0.07	9.46	0.51	9.91	0.15	3.06	0.06	0.05	48.53	0.62	4.78
CX1046	Andesite Flow	IDH033, 98-108 ft.	Extrusion																			
CX-1047	Andesite Intrusive	IDH033, 108-118 ft.	Whole Rock	KCA-Florin	07/29/2004	15.86	-0.01	8.63	0.02	0.01	0.01	0.06	8.76	0.09	9.66	0.14	3.32	0.13	0.03	49.18	0.66	2.6
CX1048	Andesite Intrusive	IDH033, 688-698 ft.	Extrusion																			
CX-1049	Andesite Intrusive	IDH033, 698-708 ft.	Whole Rock	KCA-Florin	07/29/2004	15.08	-0.01	9.67	1.55	0.07	1.48	0.04	10.63	0.18	8.4	0.2	2.66	0.12	0.4	42.35	1.04	8.91
CX1050	Andesite Flow	IDH034, 108-118 ft.	Extrusion																			
CX-1051	Andesite Flow	IDH034, 118-128 ft.	Whole Rock	KCA-Florin	07/29/2004	15.94	-0.01	9.85	0.03	-0.01	0.04	0.04	10.42	0.1	8.41	0.15	3.2	0.13	0.05	47.82	0.99	2.24
CX1052	Andesite Flow Breccia	IDH034, 544-554 ft.	Extrusion																			
CX-1053	Andesite Flow Breccia	IDH034, 554-564 ft.	Whole Rock	KCA-Florin	07/29/2004	14.19	-0.01	9.61	0.83	0.08	0.75	0.03	10.06	0.13	7.58	0.17	3.06	0.15	0.13	49.08	0.99	5.1
CX1054	Andesite Flow Breccia	IDH034, 686-696 ft.	Extrusion																			
CX-1055	Andesite Flow Breccia	IDH034, 696-706 ft.	Whole Rock	KCA-Florin	07/29/2004	15.69	0.01	5.67	0.34	0.11	0.23	0.02	8.46	0.82	7.39	0.13	3.71	0.15	0.1	52.45	0.91	3.82
CX1056	Diabase	IDH035, 122-132 ft.	Extrusion																			
CX1057	Diabase	IDH035, 132-142 ft.	Whole Rock	KCA-Florin	08/26/2004	14.64	<0.01	8.99	0.29	0.03		0.02	10.07	0.22	8.14	0.15	3.32	0.12	0.09	52.44	1.15	2.73
CX1058	Diabase	IDH035, 499-509 ft.	Extrusion																			
CX1059	Diabase+Gabbro	IDH035, 509-519 ft.	Whole Rock	KCA-Florin	08/26/2004	16.33	<0.01	8.29	0.2	0.05		0.07	8.91	0.17	10.39	0.14	3.26	0.1	0.03	50.8	0.83	3.03
CX1060	Andesite Tuff	IDH036, 57-67 ft.	Extrusion																			
CX1061	Andesite Tuff	IDH036, 67-77 ft.	Whole Rock	KCA-Florin	08/26/2004	14.89	<0.01	7.87	1	0.12		0.03	9.65	0.17	8.48	0.19	3.72	0.12	0.09	49.22	1.07	5.51
CX1062	Andesite Flow	IDH036, 355-365 ft.	Extrusion																			
CX1063	Andesite Flow	IDH036, 365-375 ft.	Whole Rock	KCA-Florin	08/26/2004	15.18	0.01	9.51	1.23	0.13		0.03	9.95	0.35	8.4	0.18	2.95	0.12	0.1	47.97	1.17	6.36
CX1064	Gabbro	IDH037, 69-79 ft.	Whole Rock	KCA-Florin	08/26/2004	19.17	0.01	10.32	0.08	0.02		0.1	5.17	0.36	11.63	0.1	2.24	0.04	0.02	48.12	0.2	3.48
CX1065	Gabbro	IDH037, 79-89 ft.	Extrusion																			
CX1066	Diabase+Gabbro	IDH037, 286-297 ft.	Whole Rock	KCA-Florin	08/26/2004	15.89	<0.01	9.09	0.11	0.04		0.05	7.96	0.1	10.4	0.13	3.24	0.05	0.17	51.7	0.73	2.31
CX1067	Diabase+Gabbro	IDH037, 297-307 ft.	Extrusion																			
CX1068	Diabase+Gabbro	IDH038, 28-38 ft.	Whole Rock	KCA-Florin	08/26/2004	19.01	<0.01	7.86	0.01	0.01		0.09	6.71	0.23	8.73	0.12	3.08	0.05	0.05	50.42	0.53	5.75
CX1069	Diabase+Gabbro	IDH038, 69-79 ft.	Extrusion																			
CX1070	Diabase+Gabbro	IDH038, 162-172 ft.	Whole Rock	KCA-Florin	08/26/2004	17.62	0.01	10.85	0.4	0.03		0.12	6.53	0.13	9.97	0.12	3.09	0.05	0.02	49.33	0.49	3.83
CX1071	Diabase+Gabbro	IDH038, 188-198 ft.	Extrusion																			
CX1072	Gabbro	IDH038, 200-203 ft.	Whole Rock	KCA-Florin	08/26/2004	21.8	<0.01	12.48	0.05	0.02		0.1	4.13	0.51	9.11	0.07	1.69	0.02	0.06	47.8	0.11	3.29
CX1073	Diabase	Surface	Whole Rock	KCA-Florin	08/26/2004	15.79	<0.01	10.54	0.03	0.02		0.05	9.84	0.25	8.23	0.15	2.34	0.08	0.09	51.8	0.89	2.33
CX1074	Dacite	IDH034, 643-648 ft.	Whole Rock	KCA-Florin	08/31/2004	15.99	0.03	2.59	0.19	0.04		0	5.55	1.47	3.48	0.08	5.74	0.11	0	62.42	0.38	1.82
CX1075	Composite	Composite	Extrusion																			

Note: All rocks are metamorphosed

Idaho-Maryland Mining Corporation

Appendix D

Sample Protocols and Testing

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Chain of Custody of Ceramic Feedstock Metavolcanic Resource Samples
Carl E. Frahme, Ph.D.

Golden Bear Ceramics has instituted and followed a stringent program of thoroughly documenting and retaining all laboratory data and information, of maintaining a traceable chain of custody for all materials and processed samples, and of safely storing all samples and materials for archival purposes. These procedures are routinely used for all development work and have been followed for the metavolcanic resource evaluation recently conducted.

As part of the ceramic feedstock metavolcanic resource evaluation, various labeled material samples were sent to KCA in Reno by the Idaho-Maryland Mining geology staff for whole rock chemical and other analyses and for grinding for evaluation by the Golden Bear Ceramics (GBC) technical staff. The ground materials were received by GBC, labeled as described in the ***Ceramics Feedstock Meta-Volcanic Resource*** document.

As part of the ceramic feedstock evaluation, most of these various materials were processed into ceramic billets in the first generation laboratory extruder (referred to as Gen I). In excess of twenty materials were so processed. The original label designations were retained, and all process work and conditions were recorded in detail in bound laboratory notebooks, with numbered, dated, and signed pages. A composite blend of the resource materials was formulated by Robert Pease, Chief Geologist- Idaho-Maryland Project, and prepared according to his memo of August 19, 2004. This "Composite Metavolcanic" blend was given the label CX-1075. This material was processed at a range of process temperatures and conditions in order to find the optimum processing parameters. Because of time constraints, all initial processing was done on uncalcined materials. CX-1075 and several other materials were processed as calcined materials as well, since ultimate processing will use calcined raw material. Processed billets were labeled with the sample designation and Lab Notebook designation to keep all samples and multiple processing clearly delineated. Direction of pressure application and extrusion was also marked on the samples. All samples have been stored in marked plastic trays in a storage chest.

Each material was then subjected to physical testing. From each billet, twenty small test bars were cut from each billet using a diamond core drill. The position of each cut bar relative the ceramic billet was recorded and retained. Samples 1-20 were placed in numbered partitions in twenty compartment plastic boxes. Each box was labeled with its sample label and the Lab Book run designation. Each of the twenty bars was broken to determine modulus of rupture (MOR) and the load and dimensions recorded on a master sheet for that sample set. After breaking, each bar pair was returned to its individual plastic box compartment.

Each of the twenty pairs of broken bars was then labeled sequentially 1, 2, 3, etc. with permanent black ink and subjected to water absorption, porosity, and specific gravity measurement using a standard ASTM test method. The data were recorded on the same master data sheet used for MOR data. The dry mass, suspended mass, and saturated mass were measured and recorded. The samples were returned to their proper plastic box compartments for storage.

The MOR and water absorption/gravity data were analyzed via an Excel spreadsheet. Since all position data for each sample were retained, the physical properties have been analyzed not only as an average for each ceramic billet sample but also by position from that billet.

In addition to physical property measurements, a number of the raw materials have been submitted for x-ray diffraction analysis in both uncalcinied and calcined form to determine the crystalline phases present. As time permits, more XRD analysis will be undertaken. The original sample labeling was used for this work as well.

A few analyses using the thermal gradient furnace recently commissioned have been completed. Samples of uncalcined and calcined historic Idaho-Maryland tailings (HIMT) and CX-1075 composite metavolcanics have been tested. This allows comparison of HIMT, the only material extruded in the second generation continuous extruder (referred to as Gen II), with the composite material CX-1075. HIMT has also been evaluated extensively in Gen I, so comparisons between the Gen I data for all materials are very helpful in predicting how the ceramic resource materials will process in Gen II. It appears that the ceramic resource materials will all process very similarly to HIMT, based on this comparison.

All raw materials are retained in sealed containers at the pilot plant. All processed samples are stored in the laboratory or in the pilot plant in plastic containers or, for larger samples, in cardboard or wooden boxes. Data and observations are kept in bound laboratory notebooks with numbered, dated, and signed pages (from Scientific Bindery Productions). Data book pages are scanned into the LAN for backup storage and retrieval. Certain data files are generated, analyzed, and kept on laboratory computers because of the calculations and statistical analysis required. These files are transferred to the corporate LAN for backup at least once a month.

In summary, all materials have been scrupulously labeled and tracked throughout the evaluation process, and all samples have been stored and are available for further evaluation and comparison.

Test Procedures for Golden Bear Ceramics and Idaho-Maryland

Carl E. Frahme, Ph.D.

Modulus of Rupture (MOR) Testing

MOR is determined for process samples using a slightly modified ***ASTM C 674-88 (Reapproved 1999), Standard Test Methods for Flexural Properties of Ceramic Whiteware Materials***. Test bars are diamond core drilled from processed ceramic billets using an internal standard procedure. Bar diameter is nominally 0.25" in diameter, as called for in the test. Because of the size of the billets, the test span is typically 1.25" instead of the 4" span specified by ASTM. All tests are run on the same basis. In most cases, 20 samples from each composition and process condition are broken, instead of the minimum of ten specimens required by ASTM. This is done on Gen I sample ceramic billets in part to measure strength in relation to the position in the billet and to assure statistical relevance. Test results have consistently been consistent and showed very acceptable levels of statistical variability. All tests have been conducted in-house under the supervision of Carl Frahme and Dr. Robert Villwock. When enough samples are available, measurements will be made for comparison at Holdridge & Kull, Consulting Engineers, in Nevada City, CA. Samples are stored in 20-compartment plastic boxes.

Porosity, Water Absorption, and Apparent Specific Gravity

These properties are measured using unmodified ***ASTM C 373-88 (Reapproved 1999), Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products***. Measurements are generally made on the broken MOR test bars so that direct correlations between flexural strength and absorption and porosity can be made.

X-Ray Diffraction (XRD)

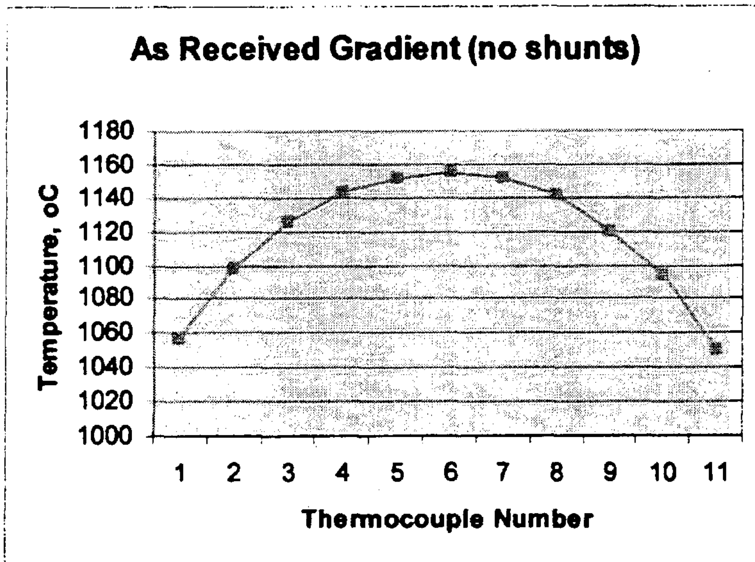
X-Ray diffraction (XRD) analysis to determine crystalline phases present has been carried out by Dr. Jim Post using his personal XRD equipment. Dr. Post, an independent mineralogist, has many decades experience in identifying phases present in all sorts of minerals and mine rock. Dr. Post maintains his x-ray diffraction and x-ray fluorescence equipment in the Idaho-Maryland building.

Whole Rock Chemical Analysis

Whole rock chemical analysis has performed on 24 different rock samples for the ceramic feedstock evaluation as well as for a large number of other materials by Kappes, Cassiday and Associates (KCA) of Reno, NV. KCA, and its Florin Analytical Services group, are highly regarded in the mining industry, with decades of experience. They also have analyzed for carbon and total sulfur and some trace metals.

Thermal Gradient Furnace

A gradient furnace has been built based on a standard horizontal tube furnace. The furnace has two alumina "Dee" tubes along its 24" inside length, each tube 12" long. Thermocouples are placed in this hearth at the center and at 2" increments from the center, giving a total of eleven temperature readings. A typical gradient plot for the furnace is given below. The midpoint temperature can be set as high as 1200°C, or at any other lower temperature. Two Inconel 601 metal trays, lined with refractory ceramic paper, and filled with material to be exposed to the temperature gradient are placed in the furnace and the furnace is raised to the desired temperature. In one such run the effect of temperature on the test materials can be seen, and samples from the test bar can be analyzed for properties.



Gradient furnaces are a common R&D tool in the ceramic industry, since they allow a large amount of firing information to be collected quickly. There are no standard designs or no ASTM Standards, but this is a recognized tool in the industry.

Sample Storage Before and After Testing

All samples are properly labeled for chain of custody and traceability and securely stored in plastic containers, plastic zipper sealed bags, or plastic, cardboard, or wood containers, depending on the nature of the samples. Raw materials, calcined powders, and remaining XRD powder samples are stored in plastic drums or bags or, for small samples, in zippered plastic bags. Processed samples and their containers are both labeled. Samples containers are stored in the ceramic laboratory or in the pilot plant.

Verification Testing Procedures
Testing procedures have been validated by running duplicate tests and by analyzing variability statistically. In general, ASTM test procedures have been used. Balances have been calibrated. Temperatures have been checked by duplicate thermocouples and by use of a precision double wavelength radiation pyrometer.

Data Storage and Management
Most data, test conditions, objectives, and observations entered into bound, numbered, dated, and signed laboratory notebooks. Some process data is stored via Labview™ software and data acquisition hardware into a laboratory computer. For convenience, breaking loads for MOR and mass measurements for water absorption, porosity, and specific gravity measurements are entered onto data sheets in a three ring binder. This data is then transferred into a computer database for analysis and is electronically stored. Numbering and labeling systems are used to preserve chain of custody and traceability.

Approximately once a month laboratory notebooks are scanned into a corporate LAN database for backup and archiving. Likewise, laboratory computer data files are backed up into the LAN.

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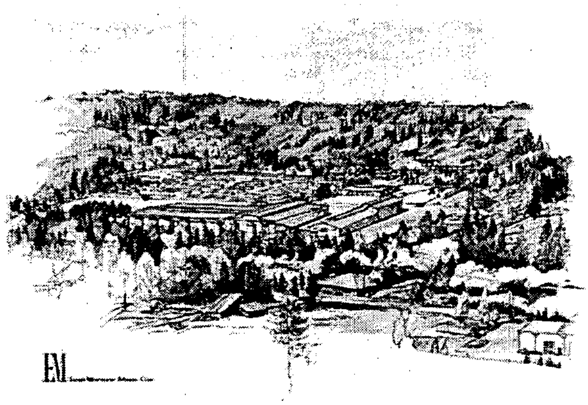
Appendix E



Flowsheet, Plant Layout, and Equipment List

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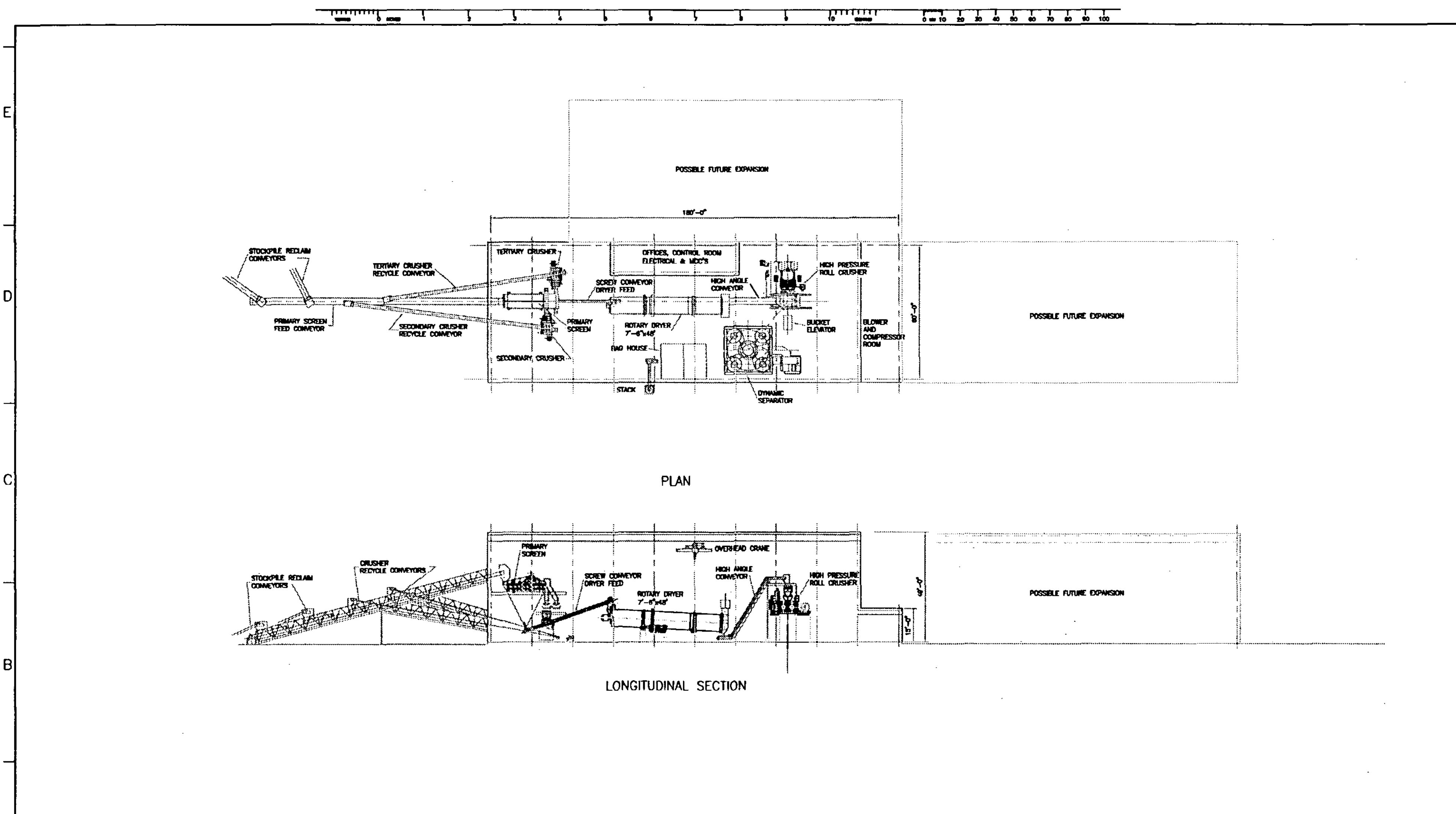

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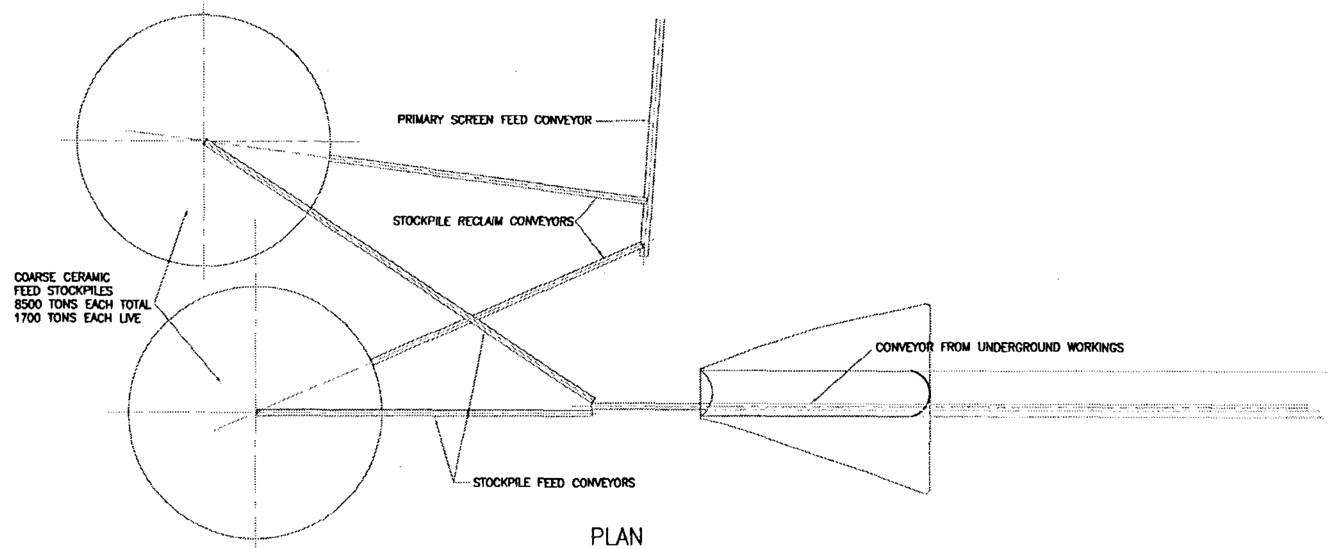
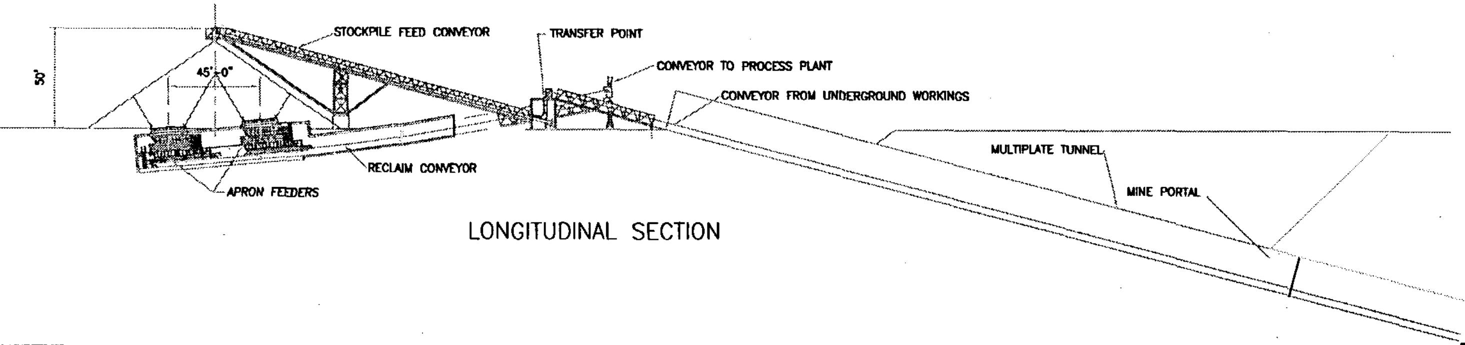


PLAN



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AREA

SUBJECT

CONCEPTUAL CERAMICS STOCKPILE LAYOUT
PLAN AND SECTION
IDAHO MARYLAND LAND SITE

IDAHO MARYLAND MINING CORPORATION

IDAHO MARYLAND MINE

DRAWING NO. 146357-100-M-0002

REV. A

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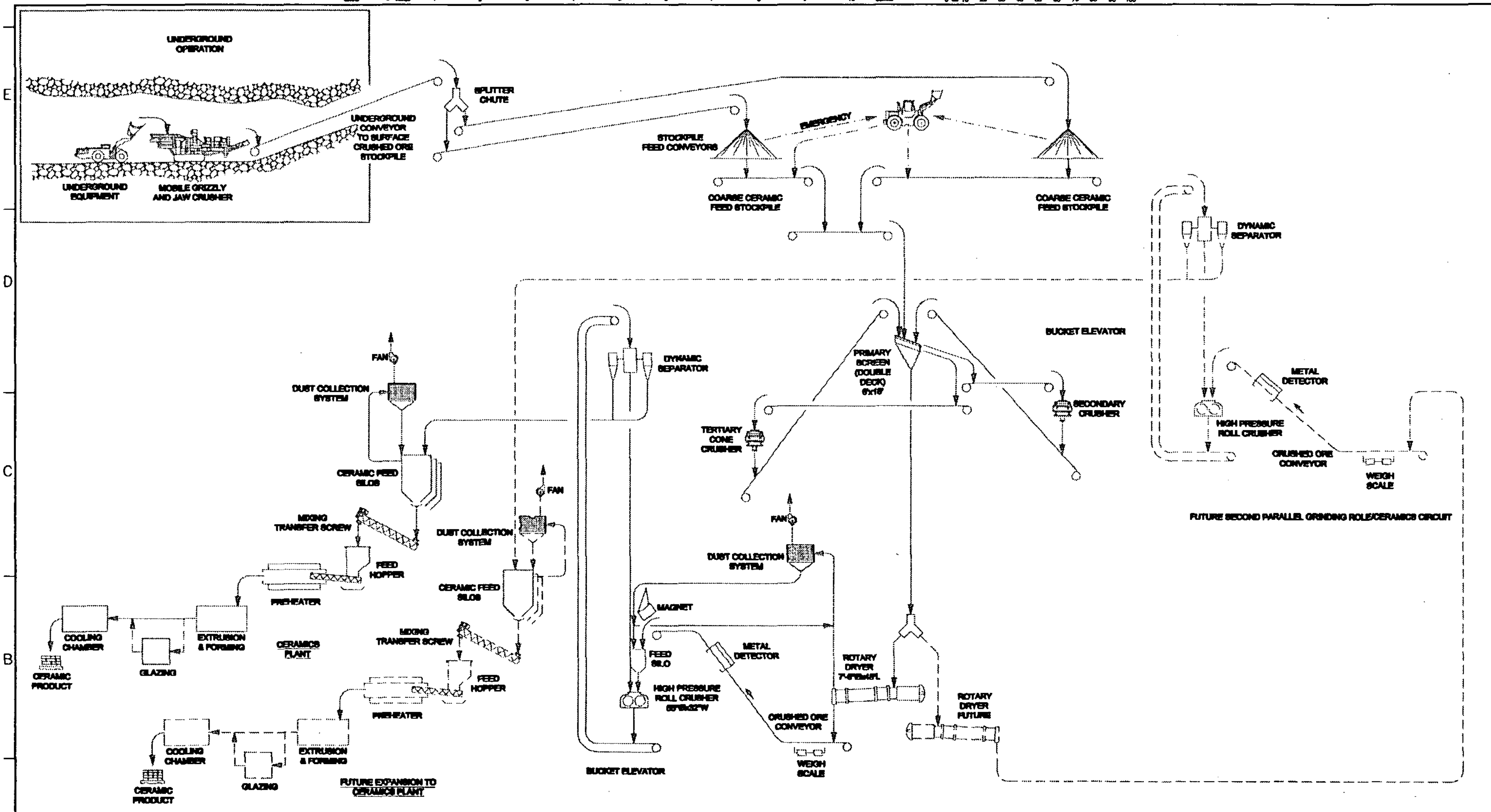

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AREA

SUBJECT: FLOWSHEET 1200/2400 STPD CERAMICS PLANT

IDAHO-MARYLAND MINING CORPORATION

IDAHO-MARYLAND MINE

DRAWING NO. 146357-100-N-0001 REV. A

CADD FILE ADDRESS

Equipment List

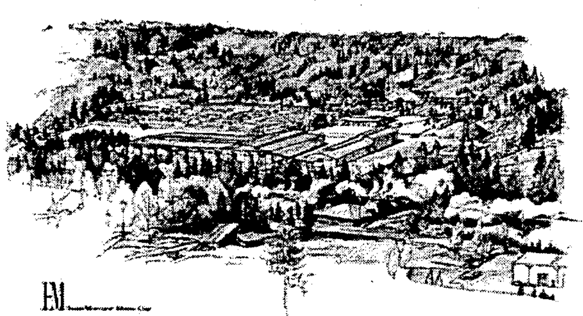
Classification	Equipment Title	Size/ Capacity	Motor Size (hp)
Process Plant (1,200 ton/d)			
Conveyor	Stockpile Feed Conveyor #1	36" x 165 ft long	30
Conveyor	Stockpile Feed Conveyor #2	36" x 165 ft long	30
Feeder	Apron Feeder #1	18 ft long	30
Feeder	Apron Feeder #2	18 ft long	30
Feeder	Apron Feeder #3	18 ft long	30
Feeder	Apron Feeder #4	18 ft long	30
Conveyor	Coarse Ceramic Feed Stockpile Conveyor #1	36" wide x 250 ft long	15
Conveyor	Coarse Ceramic Feed Stockpile Conveyor #2	36" wide x 280 ft long	15
Conveyor	Coarse Ceramic Feed Stockpile Conveyor #3	36" wide x 110 ft long	10
Crane	Overhead Crane	25 ton	50
Screen	Primary Screen	Double deck 6 x 16 L	30
Crusher	Secondary Crusher	HP 200 Standard Cone	150
Crusher	Tertiary Crusher	HP 200 Short Head Cone	150
Conveyor	Secondary Recycle Conveyor #1	36" wide x 13 ft long	10
Conveyor	Secondary Recycle Conveyor #2	36" wide x 77 ft long	10
Conveyor	Tertiary Recycle Conveyor #1	36" wide x 18 ft long	10
Conveyor	Tertiary Recycle Conveyor #2	36" wide x 93 ft long	10
Conveyor	Rotary Dryer Feed Screw Conveyor #1	42 ft long	10
Dryer	Rotary Dryer #1	6 ft diameter x 48 ft long	100
Dust Collector	Rotary Dryer Dust Collector #1	-	-
Fan	Rotary Dryer Dust Collector Fan #1	-	50
Conveyor	Crushed Ore Conveyor #1- HAC	36" wide x 30 ft long x 27 ft Lift	60
Weigh Scale	Crushed Ore Conveyor Belt Weigh Scale #1	36" wide, 200 ton/h	-
Belt Magnet	Crushed Ore Conveyor Belt Magnet #1	-	10
Rectifier	Belt Magnet Rectifier	10 kW	incl
Metal Detector	Tramp Steel Metal Detector #1	36" wide	-
Silo	HPGR Feed Silo #1	120 ton	-
Grinding Roll	High Pressure Roll Crusher #1	Studded rolls- 55" diameter x 32" wide	-
	HPRC #1 Motor 1	-	450
	HPRC #1 Motor 2	-	450
	Deagglomerator on HPGR #1- 1	-	60
	Deagglomerator on HPGR #1- 2	-	60
Elevator	Bucket Elevator #1	63 ft high	50
Dust Collector	HPRC Dust Collector #1	-	-
Fan	HPRC Dust Collector Fan #1	-	50
Separator	Ceramic Dynamic Separator #1	SEPOL separator with wear linings	150
Transfer System	Pneumatic Transfer System	1200 ton/d	100
Conveyor	HPRC Recycle Belt Conveyor #1	35 ft long	10
Compressor	Plant Air Compressor	500 cfm 125 psi	200
Compressor	Instrument Air Compressor	250 cfm 125 psi	150
Dryer	Compressed Air Dryer	250 cfm	
Receiver	Process Air Receiver	2,000 gal 125 psi	-
Receiver	Instrument Air Receiver	400 gal 125 psi	-
		Horsepower	2600
Ceramics Extruder Plant (1,200 ton/d)			
Silo	Ceramic Feed Storage Silo #1	15 ft diameter x 39 ft high (245 ton)	-
Silo	Ceramic Feed Storage Silo #2	15 ft diameter x 39 ft high (245 ton)	-
Silo	Ceramic Feed Storage Silo #3	15 ft diameter x 39 ft high (245 ton)	-
Silo	Ceramic Feed Storage Silo #4	15 ft diameter x 39 ft high (245 ton)	-

Classification	Equipment Title	Size/ Capacity	Motor Size (hp)
Silo	Ceramic Feed Storage Silo #5	15 ft diameter x 39 ft high (245 ton)	-
Dust Collector	Storage Silos Dust Collector #1	-	-
Fan	Storage Silos Dust Collector Fan #1	-	50
Bin	Ceramics Bin #1	-	-
Bin	Additives Bin #1	-	-
Conveyor	Mixing Transfer Screw Conveyor	-	30
Hopper	Preheater Feed Hopper	-	-
Preheater	Ceramics Preheaters	22 MW gas heating load includes drying and preheating	
Fan	Preheater Fans	-	incl
Hopper	Extruder Feed Hoppers	-	-
Extruder	Ceramics Extrusion and Forming Systems	9 MW electric heating load	11,775
Glazing	Glazing Systems	-	incl
Furnace	Cooling Furnaces	-	incl
Fan	Cooling Furnace Fans	-	incl
Racks	Cooling Racks	-	incl
Pump	Extruder Vacuum Pumps	-	incl
Hydraulic Power Pack	Extruder Drive Hydraulic Power Packs	-	incl
		Horsepower	11.975
Future Parallel Grinding Roll/ Ceramics Circuit (expansion to 2,400 ton/d)			
Dryer	Rotary Dryer #2	6 ft diameter x 48 ft long	100
Dust Collector	Rotary Dryer Dust Collector #2	-	-
Fan	Rotary Dryer Dust Collector Fan #2	-	50
Conveyor	Crushed Ore Conveyor #2- HAC	36" wide x 30 ft long x 27 ft lift	60
Weigh Scale	Crushed Ore Conveyor Belt Weigh Scale #2	36" wide, 200 ton/h	-
Belt Magnet	Crushed Ore Conveyor Belt Magnet #2	-	10
Metal Detector	Tramp Steel Metal Detector #2	36" wide	-
Silo	HPGR Feed Silo #2	120 ton	-
Grinding Roll	High Pressure Roll Crusher #2	Studded rolls- 55" diameter x 32" wide	-
	HPGR #2 Motor 1	-	450
	HPGC #2 Motor 2	-	450
	Deagglomerator on HPRC #2-1	-	60
	Deagglomerator on HPRC #2-2	-	60
Elevator	Bucket Elevator #2	63 ft high	50
Dust Collector	HPRC Dust Collector #2	-	-
Fan	HPRC Dust Collector Fan #2	-	50
Separator	Ceramic Dynamic Separator #2	SEPOL separator with wear linings	150
Transfer System	Pneumatic Transfer System	1200 ton/d	100
Conveyor	HPRC Recycle Belt Conveyor #2	35 ft long	10
		Horsepower	1,600
Future Ceramics Plant (expansion to 2,400 ton/d)			
Silo	Ceramic Feed Storage Silo #6	15 ft diameter x 39 ft high (245 ton)	-
Silo	Ceramic Feed Storage Silo #7	15 ft diameter x 39 ft high (245 ton)	-
Silo	Ceramic Feed Storage Silo #8	15 ft diameter x 39 ft high (245 ton)	-
Silo	Ceramic Feed Storage Silo #8	15 ft diameter x 39 ft high (245 ton)	-
Silo	Ceramic Feed Storage Silo #10	15 ft diameter x 39 ft high (245 ton)	-
Dust Collector	Storage Silos Dust Collector #2	-	-
Fan	Storage Silos Dust Collector Fan #2	-	50
Bin	Ceramics Bins	-	-
Bin	Additives Bins	-	-
Conveyor	Mixing Transfer Screw Conveyors	-	30

Classification	Equipment Title	Size/ Capacity	Motor Size (hp)
Hopper	Preheater Feed Hoppers	-	-
Preheater	Ceramics Preheaters	22 MW gas heating load includes drying and preheating	-
Fan	Preheater Fan #2	-	incl
Hopper	Extruder Feed Hopper #2	-	-
Extruder	Ceramic Extrusion and Forming System	9 MW electric heating load	11,775
Glazing	Glazing System	-	incl
Furnace	Cooling Furnaces	-	incl
Fan	Cooling Furnace Fans	-	incl
Racks	Cooling Racks	-	incl
Pump	Extruder Vacuum Pumps	-	incl
Hydraulic Power Pack	Extruder Drive Hydraulic Power Packs	-	Incl
		Horsepower	11,975
		Total Horsepower 1,200 ton/d plant	14,575
		Total Horsepower 2,400 ton/d plant	28,150

Idaho-Maryland Mining Corporation

Appendix F



Cash Flow Model

amec

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Emgold Project Ceramic Study Cashflow Projection

Tile Price	$1.30
Debt	0%
Pre-tax IRR -->	45.8%

	Calendar year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Rmdr to Yr	Total
	Project year	-2	-1	1	2	3	4	5	6	7	8	9	10	20	
Production Calculations															
Mining															
Ore Mined	Ktons	0	0	116	165	347	415	601	832	834	791	808	804	10,564	13,874
Grade	%	0%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Waste Mined	Ktons	0	0	6	8	17	21	30	42	42	40	40	40	528	694
Total Mined	Ktons	0	0	122	174	364	436	631	874	876	831	849	844	11,092	14,568
Strip Ratio		0.00	0.00	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Ceramic Production															
Feed	Ktons	0	0	0	204	408	408	612	816	816	816	816	816	10,608	13,872
Grade	%	0%	0%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Contained ceramic material	Ktons	0	0	0	204	408	408	612	816	816	816	816	816	10,608	13,872
Contained tile	Ksf	0	0	0	87,367	174,734	174,734	262,101	349,468	349,468	349,468	349,468	349,468	4,543,088	5,940,961
Recovered tile (after ignition)	Ksf	0	0	0	80,378	160,755	160,755	241,133	321,511	321,511	321,511	321,511	321,511	4,179,641	5,465,685
Gross revenue	US$000	0	0	0	104,491	208,982	208,982	313,473	417,964	417,964	417,964	417,964	417,964	5,433,533	7,105,390
Ceramext royalty	US$000	0	0	0	-3,135	-6,269	-6,269	-9,404	-12,539	-12,539	-12,539	-12,539	-12,539	-163,006	-213,162
Idaho Maryland royalty	US$000	0	0	0	-5,225	-10,449	-10,449	-15,674	-20,898	-20,898	-20,898	-20,898	-20,898	-271,677	-355,269
Revenue net of royalty	US$000	0	0	0	96,132	192,263	192,263	288,395	384,527	384,527	384,527	384,527	384,527	4,998,851	6,536,959
Cashflow Summary															
Operating Costs															
Mining: Ore	US$000	0	0	0	4,137	11,778	14,642	18,998	24,648	25,142	24,218	24,551	23,459	317,028	416,373
Mining: Waste	US$000	0	0	0	207	589	732	950	1,232	1,257	1,211	1,228	1,173	15,851	20,819
Processing	US$000	0	0	0	19,802	39,605	39,605	56,699	71,988	71,988	71,988	71,988	71,988	935,838	1,235,523
Cost of sales	US$000	0	0	0	9,613	19,226	19,226	28,840	38,453	38,453	38,453	38,453	38,453	499,885	653,696
General and Administration	US$000	0	0	0	1,159	2,431	2,909	3,157	2,912	2,920	2,769	2,830	2,815	36,973	52,461
Total Site Operating Costs		$0	$0	$0	$34,918	$73,629	$77,114	$108,644	$139,233	$139,760	$138,638	$139,048	$137,887	1,805,575	2,378,871
	US$/ton-ore	*$0.00*	*$0.00*	*$0.00*	*$211.26*	*$212.32*	*$185.85*	*$180.82*	*$167.35*	*$167.51*	*$175.27*	*$171.99*	*$171.44*	*$170.92*	*$171.46*
	US$/sq. ft.	*$0.00*	*$0.00*	*$0.00*	*$0.43*	*$0.46*	*$0.48*	*$0.45*	*$0.43*	*$0.43*	*$0.43*	*$0.43*	*$0.43*	*$0.43*	*$0.44*
Operating Cashflow		0	0	0	61,214	118,635	115,150	179,752	245,294	244,767	245,889	245,479	246,640	3,193,275	4,158,087
Pre-production Capital	US$000	0	0	130,914	65,000	0	0	0	0	0	0	0	0	0	195,914
Expansion Capital (2,400tpd)	US$000	0	0	0	10,000	50,000	75,000	19,652	0	0	0	0	0	0	154,652
Sustaining Capital	US$000	0	0	0	0	0	0	1,500	3,000	3,000	3,000	3,000	3,000	36,000	43,500
Exploration Capital (Brunswick)	US$000	0	0	3,965	4,076	5,907	5,861	11,958	10,234	1,200	0	0	0	0	43,201
Sales Tax	US$000	0	0	3,790	2,222	1,571	2,272	888	288	34	0	0	0	0	11,065
Salvage	US$000	0	0	0	0	0	0	0	0	0	0	0	0	-20,000	-20,000
Reclamation	US$000	0	0	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	13,000	20,000
NID Bond	US$000	0	0	3,000	0	0	0	0	0	0	0	0	0	0	3,000
Working Capital (Recovery)	US$000	0	0	12,000	3,960	15,802	-145	16,101	16,141	-22	47	-17	48	-63,837	0
Total Capital	US$000	0	0	154,669	86,258	74,280	83,988	51,100	30,662	5,212	4,047	3,983	4,048	-34,837	451,332
Pre-tax Net Cashflow		0	0	-154,669	-25,044	44,355	31,162	128,652	214,632	239,556	241,843	241,496	242,591	3,228,113	3,706,755

Disc Rate	Pre-tax NPV (US$000)
0.0%	$3,706,755
5.0%	$1,971,152
7.5%	$1,470,688
10.0%	$1,111,143
12.5%	$848,295
15.0%	$652,979
20.0%	$392,891
25.0%	$237,007
30.0%	$139,238
35.0%	$75,590
40.0%	$32,893
45.0%	$3,561
50.0%	-$16,957

Pre-tax IRR	Payback (from 1st prod.)
45.8%	4.8 yrs

Tile Price US$	IRR	NPV 10% US$million
1.00	31.7%	632
1.10	36.5%	791
1.20	41.2%	951
1.30	45.8%	1,111
1.40	50.2%	1,271
1.50	54.7%	1,431