CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
1520 West Adams St.
Phoenix, AZ 85007
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

The following file is part of the

Arizona Department of Mines and Mineral Resources Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

YARNELL (PLYMOUTH)

STATE MINE INSPECTOR

MAR 0 2 RECD

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Phoenix Field Office
2015 West Deer Valley Road
Phoenix, AZ 85027

P. A. H.

MAR 2 2000

IN REPLY REFER TO:

3715/3809 (933 RC)
AZA-29237

February 29, 2000

☐ N yes
☐ file
☑ Ken

Mr. Dennis Stansbury
VP Production and Development
Bema Gold Corporation
Three Bentall Centre, Suite #3113
Vancouver, BC V7X 1G4

Dear Mr. Stansbury:

Based on our review of the Plan of Operations (PO) Yarnell Mining Company (YMC) submitted in May 1999, we have concluded that the plan as proposed cannot be approved. We have stopped further processing of the plan at this time. We reached this conclusion for the reasons described below.

The Bureau of Land Management (BLM) has had long-standing concerns over the safety of your proposed blasting plan. To address these concerns, the BLM requested the Mine Safety and Health Administration (MSHA) (Enclosure 1) and the Arizona State Mine Inspector (ASMI) (Enclosure 2) to review your proposed plan. Specifically, we asked these agencies how their regulations would apply to your proposed operation. Federal regulation (30 CFR 56.6306) requires that all access to the blast area must be barricaded to prevent passage of persons or vehicles. State law (Arizona Revised Statutes (A.R.S.) 27-324) requires the vicinity of the blast site to be cleared of personnel and guarded from all means of access.

The central questions we posed to the agencies were these: From the outermost loaded hole in the proposed blast pattern, what is the approximate horizontal extent of the blast area? Will a portion or portions of U.S. Highway 89 be considered to be within the blast area, and if so, will traffic have to be stopped? Will the "Old Wilhite" property or other residences be within the blast area? If U.S. Highway 89 is within the blast area and traffic must be stopped, we asked for an estimate of the length of time traffic will be stopped for normal blasting operations. We also asked for an estimate of the projected misfire rate and the estimated road closure time when misfires occur.

We obtained estimates of 2,000 feet for the size of the blast area from MSHA (Enclosure 3) and ASMI (Enclosure 4). To clear and guard a blast area of this size it would be necessary to stop traffic on U.S. Highway 89 and Mina Road and evacuate several residences and a large section of private land (Enclosure 5). It is highly unlikely that YMC could accomplish an evacuation of private lands and residences and as a result YMC cannot be expected to conform to all applicable health, safety and environmental standards under the proposed plan as submitted, as required by 43 CFR 3715.5 and 43 CFR 3809.2-2. Because the proposed plan cannot reasonably be expected to meet the requirements of our regulations, we must conclude that the plan as proposed cannot be approved.

In addition to contacting MSHA and the ASMI, we also contacted the Arizona Department of Transportation (ADOT) (Enclosure 6) and inquired about the possibility of closing U.S. Highway 89 and Mina Road in light of the information provided by MSHA and the ASMI. ADOT has advised us that you must furnish a revised Fire and Medical Emergency Response Plan (FMERP), which must include the information provided by MSHA and ASMI, before a determination concerning road closure can be made (Enclosure 7).

To pursue your PO application further, you may choose to consider altering your mine design and incorporate blasting practices that reduce the blast areas as defined by MSHA and ASMI to such a distance that the closure of roads and highways and the evacuation of private lands and residences would not be necessary. While we are not recommending any particular blast design, a revised blasting plan to meet the required constraints might be achieved by decreasing the powder factor, decreasing the blast hole size, altering the blast size, changing delays or increasing the hole stemming. We understand that any such changes could influence equipment selection and increase equipment costs and may lower gold recoveries if the post blast particle size increases due to changes in the blast design. We encourage you to retain professional assistance in preparing a comprehensive blast design to meet the necessary constraints.

You may also choose to consider obtaining permission for the necessary road closure by filing a FMERP with the ADOT. This revised FMERP should accurately detail the estimated duration of road closures, with supporting documentation from MSHA and the ASMI. Additionally, you must demonstrate that you could accomplish the evacuation of any private lands in the blast area by providing evidence to BLM of contracts and/or agreements with all affected private landowners.

In short, you must demonstrate that the blasting plan you propose in your PO will comply with all applicable federal and state laws. For the National Environmental Policy Act (NEPA) process, you must submit a complete PO that fully describes any changes in operational characteristics such as production rates, crusher operating schedules, pit designs, equipment selection and other comprehensive changes caused by the influences of a change in your blasting techniques.

You must also alter your PO submittal to include the information reporting requirements of 43 CFR Part 3715. You must also specifically request concurrence for your proposed occupancy under 43 CFR Part 3715 in any new PO you submit.

Many interested parties have also raised the issue of the economic viability of your proposal given the sharp decline in gold prices over the last several years. The goal of the NEPA process is to disclose the character of reasonably foreseeable impacts from the proposed operation on the environment. Of course, knowing the approximate extent of the mining operation and the size of the facilities is crucial to that end. For this reason and for purposes of meeting the reporting requirement of 43 CFR Part 3715, you should revise your PO to reflect current economic conditions. Be advised that you may be required to provide documentation and rationale for any price that you use since the gold price is a key parameter in determining the extent of the final pit, spoil quantities, heap size and the duration of mining activities.

In addition to the issues concerning blasting and concurrence requirements under 43 CFR Part 3715, your proposed operation has raised additional concerns. You should realize that any plan you submit may, if approved, have several mitigation measures attached as conditions of approval. In order to address site-specific environmental concerns we advise you to anticipate and prepare engineering solutions for the following:

The BLM, the Environmental Protection Agency (EPA), State agencies and the public have concerns over your proposal to regrade the spoil and heap outslopes to a final grade of 2:1. Our Solid Minerals Reclamation Handbook, which was given to you and referenced in your PO of December 1994, your Closure and Reclamation plan of March 1996, and the PO of May 1999, specifically recommends that outslopes be regraded to 3:1 or flatter to enhance the success of revegetation (see page XI-1).

It is well documented that flatter slopes significantly reduce erosion rates. As an example, the Environmental Impact Statement (EIS) prepared by BLM for the Golden Sunlight Mine states on page 307, "The potential erosion rates for 2:1 slopes under this soil replacement scenario are 7.2 and 9.6 tons per acre per year for the 1- and 5-year time frames, respectively. For 3:1 slopes, these values are 4.6 and 5.0 (tons per acre) per year." These figures indicate that a nearly 50 percent reduction in erosion rates could be achieved by employing a 3:1, rather than a 2:1 design in this instance.

Annual precipitation rates for the Golden Sunlight Mine in Montana are given in the EIS as between 13 and 15 inches. The average annual precipitation rate for Yarnell Hill based on Maricopa Flood Control District (MFCD) data is 15.3 inches per year (average of 14 years of data). Through a comparison of annual precipitation rates, and roughly similar rocky soils, it is reasonable to infer that erosion rates at the Yarnell site could be significantly reduced by using 3:1 slopes as was the case for the Golden Sunlight Mine. Based on this potential reduction in erosion rates, your revised mine plan must adopt a 3:1 regrade design for all facilities or you must submit direct physical evidence, based on site specific testing, that indicates your proposed design can reasonably be expected to perform to levels of erosion control and revegetative success comparable to a 3:1 design. Your estimate for the annual precipitation rate at the Yarnell project site in the PO (see page 3-2, Table 3.1) is given as 20 inches per year. This figure seems high in light of the MFCD data, but if correct would lead to even higher erosion rates.

Our analysis of expected noise impacts indicates that your proposed operation will cause noise levels that exceed the level (55db) determined by the EPA as adequate to provide for public health and welfare. The EPA determination was developed in document number EPA 550/9-74-004, titled "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety." (This publication is available from the U.S. Department of Commerce, National Technical Information Service, Springfield, VA 22161, or by phone at (703) 605-6000. Although the EPA publication is not intended as a standard, specification or regulation, it is the best available scientific gauge for determining noise levels above which the health of the citizens of Yarnell and others on adjacent public, state and private lands would be affected.

Based on this EPA research, it is reasonable that any approval of a PO be conditioned upon measures aimed at reducing ambient noise levels to the 55db level at all receptor locations on private, state or public lands outside the control of YMC. You should therefore incorporate mitigation measures that achieve this end. Possible mitigation measures could include changes in production rates, operating hours, equipment selection, sound barricades, mine scheduling and facilities siting. You may also elect to produce your own scientific studies to demonstrate that noise levels above 55db would not constitute a threat to health and safety. If so, please forward such studies to BLM for consideration. BLM will decide the matter based on the best available science.

Finally, your earlier submissions suggested that the PO was merely a starting point, or implied you could revise the PO without the consent of BLM. For example, in your May 1999 PO, you state "YMC will continually review the blast results of these initial designs and adjust future designs based on observed results and changing geologic conditions." Be advised that any future submittal must be written to indicate what you will do in specific terms. Pursuant to 43 CFR Part 3809, you may submit a modification to an approved PO for such things as changing geologic conditions, but changes or modifications are <u>not</u> allowed without review and approval by BLM and possibly other federal and state agencies.

Should you elect to submit a revised PO that addresses the concerns raised in this letter, the BLM will once again undertake review under the 43 CFR Part 3715 and Part 3809 regulations. Until you submit a revised PO and we have reviewed your revisions fully, we cannot tell you how the revisions will affect the NEPA review process or consideration of any other legal issues that may be involved in your proposed operations. Moreover, we have not yet received a response to our request for a legal opinion from the Solicitor's Office regarding various issues related to your proposed operation. Please understand that if BLM determines that the revisions in your plan are substantial, it may be necessary to

prepare a supplemental draft EIS or restart the NEPA process. Of course, we will endeavor to process any plan that fully addresses the concerns and issues raised as expeditiously as possible. If you have any questions, please contact Connie Stone at (623) 580-5661 or Ralph Costa at (602) 417-9349.

Sincerely,

Michael A. Taylor
Field Manager

Enclosures

1. July 16, 1999 letter to J. Davitt McAteer, Mine Safety and Health Administration
2. July 16, 1999 letter to Douglas Martin, Arizona State Mine Inspector
3. September 8, 1999 letter from Mine Safety and Health Administration
4. September 20, 1999 letter from Arizona State Mine Inspector
5. BLM generated map of the proposed Yarnell operation with a 2000 foot blast radius
6. September 24, 1999 letter to John Fought, Arizona Department of Transportation
7. October 20, 1999 letter from John Fought, Arizona Department of Transportation

cc: Douglas K. Martin, Arizona State Mine Inspector (w/o encl)
Harry Verakis, Mine Safety and Health Administration (w/o encl)
Laura Gentile, Environmental Protection Agency (with/encl)
John Fought, Arizona Department of Transportation (w/o encl)

Arizona State Mine Inspector
DOUGLAS K. MARTIN
1700 W. Washington Suite 400
Phoenix, Arizona 85007-2805
(602) 542-5971
Fax (602) 542-5335

September 20, 1999

Mr. Gary D. Bauer
Acting State Director
United States Department of Interior
Bureau of Land Management
Arizona State Office
222 North Central Avenue
Phoenix, AZ 85004-2203

Reference: *3715/3809 (93) Letter of July 16, 1999 from Gary D. Bauer, BLM Acting State Director, to Douglas K. Martin, Arizona State Mine Inspector.*

Dear Mr. Bauer:

This letter provides responses to your questions and our additional comments regarding the proposed blasting procedures outlined in the Yarnell Project Mining Plan of Operation, May 1999, BLM #AZA-29237.

For clarity, your questions are shown in bold with parentheses, then followed by the ASMI response. After the questions and responses we have included general and section specific comments.

Questions:

"From the outermost loaded hole in the proposed blast pattern, what is the approximate horizontal extent of the area to be cleared of personnel and guarded?"

A 2,000 ft minimum from the outermost loaded hole is recommended until confidence has been established in Yarnell Mining Company's blast design, supervision, and performance. This could be reduced to 1,500 ft minimum after actual results are observed and the pit becomes deeper. A critical procedure is stemming with ¾" crushed rock. In the field this requires strict supervision since miners are always tempted to just use the drill cuttings. Using drill cuttings without the ¾" crushed rock will cause poor confinement of the charge resulting in increased air blast and fly rock.

"Will a portion or portions of U.S. Highway 89 be considered to be within this area, and if so, will traffic have to be stopped?"

Portions of U.S Highway 89 will be within the area that must be cleared and guarded. Traffic on the highway must be stopped outside the cleared and guarded area.

"Will the "Old Wilhite" property be within this area?"

The "Old Wilhite" property is within the area that must be cleared and guarded.

"If U.S. Highway 89 is within the blast area and traffic must be stopped, please estimate the length of time you believe that the traffic will be stopped for normal blasting operations."

Based on YMC Plan of Operations and the Mining Code of the State of Arizona, the estimated minimum time that traffic must be stopped would be 30 minutes.

Details of 30 minute estimate:

Plan of Operations calls for stopping traffic 5 minutes before blast. Mining Code of the State of Arizona R11-1-273 has been interpreted and enforced to require a wait of least 15 minutes after blasting (Nonel or electric caps) for clearing of gases and dust, and to minimize risk from delayed detonation of misfires. Blast supervisor returns to inspect the blast *after* the 15 minute minimum wait. Blast supervisor inspecting a blast with 200+ holes will take about 10 minutes to confirm that there are no misfires and issue the all clear signal.

Likely sequence of events and timeline for scheduled blast at 16:00 hrs.

YMC Personnel Stationed on Public Roads	15:50
Traffic Stopped on U. S. Highway 89	15:55
Three Minute Warning	15:57
One Minute Warning	15:59
Twenty Second Warning	15:59:40
Blast Fired	16:00
Blast Supervisor returns to inspect	16:15
Blast Supervisor completes inspection	16:25
All Clear Signaled and Traffic Resumes	16:25

Traffic stopped from 15:55 to 16:25 hrs = 30 minutes

"Also, please provide an estimate of the projected misfire rate and the estimated road closure time when misfires occur."

Misfires will be rare with good blast design and proper field execution. Projected misfire rate would be five misfire incidents per year, based on blasting twice per week with a misfire event frequency of 5%. Estimated road closure time would be extended two to eight hours to "reprime" and blast misfires.

Most misfire incidents will probably occur during startup as the blasting designs and procedures are being finalized with field experience. There will be a practical experience learning curve for the mine operator that is site specific.

General Comments:

Resolution of issues with closure of U.S. Highway 89 and blasting near residential areas are critical for approval of the Plan of Operation.

Since the mine is located close to residential areas, the operator must communicate effectively and provide orientation to area residents on the Plan of Operation, especially the blasting section. BLM should consider requiring the mine operator to provide documentation from the residents within the 2,000 ft radius that they understand and will comply with the clearing and guarding procedures (particularly for the "Old Wilhite" property).

YMC may wish to consider "buy out" of nearby residents and construction of a detour bypass for a portion of U.S. Highway 89.

The "buy out" of nearby residents could be at current appraised property value. Original property owner could continue to reside on the property with a "lease back agreement" requiring the resident to follow blast clearing and guarding procedures. Lease back agreement terms could address blast damage settlements and eventual return of the property to original owners after the mine is closed. The original owners would not be exposed to any possible devaluation of their property because of the mining activities and could ultimately retain ownership if desired.

U.S. Highway 89 detour route for use only during clearing and guarding of the blasts could be constructed. The one-way detour should be gated off between blasts and only used as a bypass during guarding of blasts.

Blasting schedule should be posted and distributed to residents of Glen Ilah and Yarnell. "Speed dial" phone notification of residents an hour before the blast should be included in the procedures.

If the "buy out" of closest residents and the highway detour are not feasible, YMC could review alternative blast designs and Plans of Operation that would reduce the area for clearing and guarding to about 400 ft. This would impact significantly the mine plan since blast hole diameter, spacing, number of blast holes per shot, explosive charge weight per delay, and possibly blast hole depth would have to be changed. Blasting mats to control fly rock would be required.

YMC must consider the direction of winds prior to blasting to ensure that dust and gases do not spread to residential areas.

Cloud cover at the time of blasting must also be considered since the reflected air blast and noise can impact and cause damage to nearby residences.

Lightning storms pose a threat of premature detonation of the blast. The same area for clearing and guarding for normal blasting must be cleared and guarded if explosives are in the blast holes when a storm approaches. This means the highway would be closed to traffic until the lightning storm passes.

Comments by Section:

7.2.6.1 Blast Patterns and Powder Factor

Clarification is required for meaning and intent of the statement: *"Powder factors will be reduced, as appropriate, when the blast area is cleared to a distance of 400 to 500 feet."*

7.2.6.4 Initiation System Hookup Procedures

Detonating cord for surface tie-ins creates a high level of nuisance noise. "Detaline" or equivalent could be considered for the surface tie-ins to reduce noise.

Initiation of lead-in line should be non-electric also. Description should be provided for how the lead-in line will be initiated. If an electric cap is used for initiation of the lead-in line, then regulations for control of extraneous electricity and radio transmissions would apply.

7.2.6.5 Clearing and Guarding Procedures

Clarification is required for meaning and intent of the statement concerning distance for clearing and guarding: *"..but no further than 1750 feet from the blast pattern."*

TABLE 7.2 Blast Hole Loading Chart

Based on the chart and the "Old Wilhite" property that is about 800 feet away, the maximum charge per delay is 211.6 lbs, which is less than the proposed nominal charge per delay of 235 lbs.

7.2.6.11 Schedule

Statement is confusing and could be phased more clearly. *"One blast will be initiated two days each week under an approved blasting schedule"*. This is understood to mean that blasting will occur twice per week, is this correct? Also, who approves the blasting schedule? BLM, ASMI, YMC, ADOT, City of Yarnell?

7.2.6.12 Pre-blast Inspections

Structural Inspections – What if property owners do not consent (i.e. accept the YMC offer) for pre-blast structural inspections? The inspection should be extended to structures within 1 mile of the proposed blasting area. How does YMC plan to deal with property owners opposed to the mine that will claim every cracked window, foundation, wall, broken knick-knack, etc. was caused by mine blasting? Plan of Operation should include a copy the acceptable vibration levels and the standard (s) referenced (OSM, BLM, State of Arizona).

7.2.6.13 Blast Monitoring

It is suggested to add a seismic monitor station close to the structures in Yarnell that are nearest to the mine.

Include a copy of the vibration levels referenced as the surface mining limits for the State of Arizona.

7.2.6.14 Traffic Control

Use 2,000 feet from the outermost blast holes for traffic control areas.

Figure 7.7 Typical Blast Hole Patterns

It is suggested to include an estimate of the total pounds of explosives for each of the patterns.

Figure 7.8 Typical Blast Hole Detail

What is meant by "initially" in the reference to stemming "*MINUS ¾ INCH CRUSHED ROCK (INITIALLY)?* This could suggest that crushed rock may not be used at sometime in the future?

Please contact me or Phil Howard at (602) 542-5971 if you have further questions or if we can be of additional assistance. You can count on our continued assistance for whatever you needs may be with Yarnell Project and other future mining projects.

Sincerely,

Douglas K. Martin
Arizona State Mine Inspector

Attachment: Copy of Letter, July 16, 1999, from Gary D. Bauer, BLM Acting State Director, to Douglas K. Martin, Arizona State Mine Inspector

Yarnell Mine file K
Yavapai

YARNELL MINING COMPANY

February 19, 1998

LETTER TO PROJECT SUPPORTERS

RE: Yarnell Gold Project - Yavapai County, Arizona

Dear Supporter:

Enclosed is some material regarding the Yarnell Mining Company's proposed gold mine project. Your support has been important to our success thus far, and as we move into our permit approval process your help will be even more critical.

As you may know, The Yarnell Mining Company is part of an international corporation that has extensive experience in gold extraction and mine reclamation. Bema Gold Corporation has achieved wide recognition for its use of state-of-the art extraction technology and its commitment to reclaiming the land once the extraction process is completed. In the brochure there is a good summary of an Idaho project, similar to the one we are proposing near Yarnell.

The Yarnell Mining Company has been working on this project since 1994. If all the regulatory approvals are received, we expect to begin construction by the fall of this year.

The mine will employ about 90 people during full-scale production and will operate for six years. Salaries and benefits will generate more than $3 million each year. Another $3.5 million will be paid annually for products and services, and a total of $12 million will be spent on capital costs during the life of the mine.

We are now in the final stages of permitting the mine. A number of activities are occurring this spring, and we want to make you aware of them so you can demonstrate your support to the government agencies involved.

The Arizona Department of Environmental Quality (ADEQ) has announced its intent to approve both the Aquifer Protection Permit and the Air Quality Protection Permit. The ADEQ will conduct a public meeting and formal hearing concerning these two permits on March 2, 1998. We would welcome and encourage your attendance and supportive comments at this time. They will be held at the:

Wickenburg Community Center
155 N. Tegner Street
9:00 a.m. to 7:00 p.m.
(Open-House Format)

23391 S. Highway 89, P.O. Box 1182, Yarnell, Arizona 85362 Tel: (520) 427-3353 Fax: (520) 427-6404
A Subsidiary of Bema Gold (U.S.) Inc.

We have enclosed two fact sheets which provide specific information on our proposed air and water quality protections for your reference.

Written comments can be submitted to ADEQ until March 16. These comments can be sent to:

Mr. Tony Bode, Project Officer
Water Permits Section
Arizona Department of Environmental Quality
3033 N. Central Avenue
Phoenix, AZ 85012

Since part of the project would be located on federal lands, the Bureau of Land Management (BLM) has taken the lead with other federal agencies to study the proposal, and is preparing a Draft Environmental Impact Statement. This comprehensive analysis of the project's environmental effects should be published this spring, and public hearings held later to discuss the draft report. We will alert you when the hearings have been scheduled and would again welcome your attendance and supportive comments.

We believe we have a very solid proposal that is both economically sound and protective of the environment and neighboring community. If you have any questions or would like a tour of the site, please call me at (520) 427-3353.

We also would be pleased to make additional copies of our material available to any other residents or speak to any local groups. We appreciate your continued support and look forward to being an active part of the Yarnell community and the Arizona mining industry.

Sincerely,
for **Yarnell Mining Company**

Mark Montoya
Project Manager

MAM:cgm

Enclosure(s)

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Arizona State Office
222 North Central Avenue
Phoenix, AZ 85004-2203

In reply refer to:
3715/3809 (933)

July 16, 1999

Mr. Douglas K. Martin
Arizona State Mine Inspector
1700 West Washington, Suite 400
Phoenix, AZ 85007-2805

STATE MINE INSPECTOR
JUL 16 1999

Dear Mr. Martin:

This letter is to formally request assistance from you concerning a proposed mining operation. The Bureau of Land Management(BLM) is reviewing a Plan of Operations (PO) for a surface gold cyanide-leach mining operation near the town of Yarnell, Arizona.

This PO was submitted by Yarnell Mining Company (YMC) to conform with the BLM surface management regulations (43 CFR 3809). These regulations require that an operator, in this case YMC, have an approved PO before beginning operations. BLM has concerns over the safety of the blasting operation proposed by YMC in the PO. Our chief concern is the proximity of a house and U.S. Highway 89 to the area proposed for blasting. U.S. Highway 89 is the chief access to the town of Yarnell from the south. There is presently no viable detour and the highway carries a moderate level of traffic. As you can see from the enclosed Figure 7.1, the highway is within 400 feet of the proposed pit boundary, and the house (Old Wilhite Property) is within 800 feet.

In our processing of this PO, we have several urgent technical questions concerning the Mining Code of the State of Arizona should the project be approved. We know from reading Arizona Revised Statute (A.R.S.) 27-324 that the vicinity of the blast site must be cleared of personnel, and all means of access to the area must be guarded.

The central questions we pose to you are these: From the outermost loaded hole in the proposed blast pattern, what is the approximate horizontal extent of the area to be cleared of personnel and guarded? Will a portion or portions of U.S. Highway 89 be considered to be within this area, and if so, will traffic have to be stopped? Will the "Old Wilhite" property be within this area? If U.S. Highway 89 is within the blast area and traffic must be stopped, please estimate the length of time you believe that traffic will be stopped for normal blasting operations. Also, please provide an estimate of the projected misfire rate and the estimated road closure time when misfires occur.

To assist you, we have provided the pertinent sections of the PO which describe in detail the site geology and blasting procedures proposed by YMC. If you have any questions or if we can be of assistance, please contact Ralph Costa at (602) 417-9349. Thank you for considering our request for assistance in this matter.

Sincerely,

Gary D. Bauer
Acting State Director

Enclosures

August 23, 1999

Mr. Michael A. Taylor, Manager
Phoenix Field Office
Bureau of Land Management
2015 W. Deer Valley Road
Phoenix, AZ 85027

RE: Yarnell Mining Project, Yavapai County - Case File No. 3809 (020) AZA-29237

Dear Mr. Taylor:

In an effort to reduce costs during the current depressed metals market, Yarnell Mining Company ("YMC") will no longer provide financial funding to support the costs associated with preparing the NEPA documentation for the subject project. This includes terminating the third-party contractor assisting BLM with the preparation of the NEPA documentation and the funding supporting your agency with its efforts to complete the NEPA process. Nonetheless, YMC does not intend to withdraw its Mining Plan of Operation ("MPO") for the Yarnell Project. Recognizing that the current Memorandum of Agreement ("MOA") between YMC and BLM will need to be amended to reflect this development, we trust that BLM will proceed with its obligation to complete the Final Environmental Impact Statement and issue a Record of Decision on the project.

The company will continue to support the defense against the pending appeal filed with the Arizona Superior Court on the Aquifer Protection Permit issued by the Arizona Department of Environmental Quality in June last year. However, YMC will curtail the advancement of other regulatory permitting activities at the property until further notice.

The Company will close its office in Yarnell at the end of August and Bema Gold Corporation ("Bema", YMC's parent company) will manage the affairs of YMC out of its corporate headquarters in Vancouver, British Columbia. Beyond August 31, all inquiries concerning the Yarnell Project should be directed to Mr. Dennis Stansbury, Vice President Development and Production, at Bema's corporate office:

Three Bentall Centre, Suite #3113
595 Burrard Street
P.O. Box 49113
Vancouver, BC V7X 1G4
Tel: 604-681-8371
Fax: 604-681-1242

The company remains committed to the development of the Yarnell Project and intends to aggressively pursue the advancement of all regulatory permits when gold prices recover. The

Yarnell Project is designed as a state-of-the-art facility and it remains the company's primary goal to construct, operate and reclaim an innovative and responsible gold mine, and again demonstrate that mining and a healthy environment can coexist.

We will contact Connie Stone to schedule a meeting for purposes of amending the MOA. Meanwhile, please provide us with a final invoice for payment of any outstanding BLM expenses to date, as entitled under the current MOA.

Sincerely,
for Yarnell Mining Company

Mark Montoya
Project Manager

cc: Connie Stone - BLM Project Manager
Laura Gentile - U.S. EPA Region IX, Environmental Scientist
Marjorie Blaine - U.S. Army Corps of Engineers, Senior Project Manager
Nancy Wrona - ADEQ Air Quality Division, Director
Prabhat Bharghava - ADEQ Air Quality Division, Permits Section Manager
Karen Schwab - ADEQ Aquifer Protection, Project Officer
James Skardon - Assistant Attorney General, Environmental Enforcement Section
Douglas Martin - Arizona State Mine Inspector
✓Doug Sawyer - Arizona Department of Mines & Mineral Resources, Director
Cynthia Stefanovic - Arizona State Land Department, Water Resource Supervisor
Phil DeDycker - P.M. DeDycker & Associates, Principal
Larry Hansen - AGRA Earth & Environmental, Senior Project Manager
Dennis Stansbury - Bema Gold Corporation, VP Development & Production
Ken Booth - Bema Gold Corporation, VP Corporate Development & Communications

Yarnell Mine(f)
Yavapai County

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Phoenix Field Office
2015 West Deer Valley Road
Phoenix, AZ 85027-2099

IN REPLY REFER TO:

3809 (020)
AZA-29237

June 22, 1998

Dear Reader:

The Bureau of Land Management (BLM) has prepared a draft environmental impact statement (DEIS) in response to a proposed mining plan of operations submitted to the Phoenix Field Office by the Yarnell Mining Company, a subsidiary of Bema Gold (U.S.) Incorporated. The proposed Yarnell Mining Project would consist of surface mining and ore processing facilities to recover gold near the town of Yarnell in Yavapai County. The DEIS documents the analysis of potential environmental and socioeconomic impacts of the proposed mining project.

You are included on the mailing list for the Yarnell Mining Project DEIS. Enclosed for your review is a copy of the document's Executive Summary. The DEIS is available for review at the BLM Phoenix Field Office, 2015 West Deer Valley Road, Phoenix; the BLM Arizona State Office, 222 North Central Avenue, Phoenix; and at public libraries in Wickenburg, Yarnell, and Prescott. Copies of the document can be obtained at the BLM offices in Phoenix or by contacting Connie Stone at (602) 580-5517.

The public comment period is open for 60 days, beginning on June 26, 1998. **All comments will be accepted until August 25, 1998.** Please note that comments, including names and street addresses of respondents, are available for public review and may be published as part of the Final EIS, or other related documents. Individual respondents may request confidentiality. **If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this prominently in your written comment.** Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

You are invited to attend public hearings to be held on the following dates:

Tuesday, July 28 in Wickenburg, Arizona at the Wickenburg Community Center, 160 North Valentine Street, 6:00 to 9:00 p.m..

Wednesday, July 29 in Yarnell, Arizona at the Yarnell Senior Center, 136 Broadway Street, 4:00 to 8:00 p.m.

Thursday, July 30 in Prescott, Arizona at the Prescott Resort Conference Center, 1500 Highway 69, 6:00 to 9:00 p.m.

YARNELL MINING COMPANY

A SUBSIDIARY OF BEMA GOLD (U.S.) INC.

YARNELL MINING COMPANY PROJECT FACT SHEET

February 1998 *Issue 1, Vol. 1*

What will Yarnell Mining Company do to protect groundwater and surface water quality?

The Yarnell Heap Leach Facility will be constructed using state-of-the-art mining technology. Bema Gold Corporation, Yarnell Mining Company's parent company, has successfully used this technology at its other mining projects. The Arizona Department of Environmental Quality (ADEQ) regulates industrial impacts to water quality and requires the use of Best Available Demonstrated Control Technology, (known as "BADCT"). BADCT specifies the best known methods of constructing a mining facility for protecting groundwater and surface water. By designing its facility to meet prescriptive specifications outlined in the Arizona Mining BADCT Guidance Manual, Yarnell has demonstrated BADCT.

The facility's design includes control features which allow the Company to closely monitor the facility during construction and operation for any problems. Listed below is a summary of the controls incorporated into its design, construction and operation.

Solution Storage Ponds

- *Two process solution ponds will be constructed to contain the solution used in the heap leach process. Both solution ponds will be double-lined with high density polyethylene (HDPE), and a leak detection system will be installed between the two liners and monitored daily for the presence of moisture. The HDPE liners will be installed on top of a thick, compacted, soil layer containing clay.*

- *A third pond will be constructed to provide additional storage and to collect stormwater if heavy rains occur. This pond will again be lined with HDPE and a leak detection system will be installed.*

- *All of the ponds are designed to handle extreme precipitation conditions. Together, the ponds have sufficient capacity to contain a 100-year, 24-hour storm event involving the entire heap leach facility, in addition to the working volumes and the solution that would drain from the heap during a 24-hour power outage. Since the Company plans to generate power at the site and will have access to a backup power supply, it can pump the solution from the ponds to the heap in the case of a continuing power outage. Also, additional emergency storage will be available.*

Heap Leach Pad

- *One dedicated heap leach pad will be constructed to contain all of the ore mined during the six-year mine life. The heap leach pad will be lined with HDPE on top of a compacted, one-foot thick layer of soil containing clay.*

- *A leak detection system will be constructed within the liner system to enable the Company to monitor for any leakage through the HDPE liner throughout the entire leach pad. Any leakage will drain into a system of pipes, which connects to three sumps along the south side of the heap leach pad. These sumps will be monitored daily.*

- *A protective layer of crushed ore will be placed on the liner before normal placement of ore and equipment is allowed on the pad.*

(Continued on Page 2)

Other Protective Measures

- *Stormwater diversion channels will be constructed to safely convey the peak runoff from the 100-year, 24-hour storm event. These channels will be inspected monthly.*
- *Sediment retention ponds will be built downgradient from both waste rock dump areas to collect surface water runoff and sediment.*
- *A subsurface drain system will be constructed beneath the heap leach pad and solution ponds to collect any shallow groundwater flow (if it occurs) and convey it to a sump for removal.*
- *The HDPE liner will be placed under the entire heap leach facility, including the processing plant.*

What kind of monitoring activities will be conducted to ensure compliance?

Facility Design

- *The entire heap leach facility, including the leach pad, ponds and leak detection sumps will be inspected daily for any signs of leakage or physical damage. All damage and repairs will be documented in a log book.*
- *Mined waste rock (the rock that does not contain gold) will be sampled and analyzed quarterly during operation to ensure that the material will not adversely affect water quality.*

Groundwater and Surface Water Monitoring

- *Yarnell Mining Company has already collected eight quarterly groundwater samples from wells at the site to establish existing water quality data and to provide a baseline for comparison with groundwater quality during and after operation. The Company will continue to monitor groundwater downgradient from the heap leach facility quarterly during operation and following closure to ensure there are no impacts to groundwater from the mining operation.*
- *Yarnell Mining Company will also monitor two natural springs downgradient from the property to establish current conditions and ensure that water quality is not adversely affected. Results from this testing will be reported quarterly.*
- *Monitoring results will be reviewed by ADEQ to ensure compliance with water quality standards. If water quality standards are exceeded, Yarnell Mining Company will follow the requirements of a comprehensive contingency plan to evaluate and rectify any problems.*

Contingency Plans

- *In the event that the leak detection systems detect leakage in the process solution ponds or leach pad, comprehensive contingency plans have been developed to quantify the problem and take necessary steps to correct the situation. Plans include closure of the affected facility area and installation of additional groundwater monitoring wells if necessary.*
- *If the results of waste rock sampling indicate specific material has the potential to degrade water quality, the Company will separate this material to isolate it from air and direct precipitation and buffer it with inert material.*

(Continued on Page 3)

- *Detailed plans are also in place to address slope stability issues, drainage structure performance, spills and other emergency response situations.*

What closure activities will be undertaken when the mine operation is completed?

- *At closure, Yarnell Mining Company will rinse the heap leach material with fresh water until gold values in the liquid reach levels that become uneconomical to recover.*
- *Following this passive rinsing phase, active rinsing with an oxidizing agent would be conducted, until water quality standards are met. Once the water quality standards are met, the facility will be reclaimed.*
- *The Company has submitted a closure and reclamation plan for the mine site to ADEQ and the Bureau of Land Management. Upon completion of closure activities, the Company will submit a detailed post-closure plan to ADEQ for approval. The Company will continue to maintain and monitor the area to eliminate any reasonable probability of further discharge from the facility, and to ensure that water quality standards are met.*
- *Yarnell Mining Company assumes responsibility for the closure and reclamation attributable to the mining operation and related facilities. Reclamation and closure responsibilities are consistent with the Arizona Mined Land Reclamation Act, the Federal Mining and the Mineral Policy Act and National Materials and Minerals Policy Research and Development Act. According to these guidelines, the full projected costs for closure will be bonded.*

How will Yarnell Mining Company assure its quality control?

A third-party, Arizona-registered Professional Engineer will be responsible for all quality assurance procedures during construction of the heap leach facility. This engineer will ensure that the facility is constructed according to the BADCT design specifications. Comprehensive testing will be conducted to ensure that the synthetic liner material (HDPE) is of the highest quality and installed correctly, and that the compacted soil layer is constructed to BADCT design specifications.

Need any more information?

The Yarnell Mining Company staff is available to answer your questions. Please feel free to call us at *(520) 427-3353*.

YARNELL MINING COMPANY

A SUBSIDIARY OF BEMA GOLD (U.S.) INC.

YARNELL MINING COMPANY PROJECT FACT SHEET

February 1998 *Issue 1, Vol. 1*

What will Yarnell Mining Company do to protect air quality?

All large industrial activities which generate air emissions are regulated by state and federal laws. These laws specify emission limits and require certain emission controls.

Before the Yarnell Mining Company can begin to operate, it must obtain an Air Quality Control Permit from the Arizona Department of Environmental Quality (ADEQ). In its permit application, the Company must present a detailed computerized model which estimates the maximum, total emissions that could be generated by the project. It also outlines how the Company will control and regulate those emissions.

The mine design includes many operational control features to allow Yarnell Mining Company to closely monitor and reduce air emissions. The Company will take precautions to limit particulate matter from becoming airborne during construction, blasting, hauling, crushing and earth moving and handling operations, and emissions caused by diesel equipment and the ore processing facilities. Bema Gold Corporation, Yarnell's parent company, has successfully used this technology at its other mining projects.

Listed below is a summary of the measures that will be taken and the controls incorporated into the design and operation of the Yarnell project.

Air Emission Controls

The Air Quality Control Permit requires that Yarnell Mining Company incorporate numerous controls on the mine facilities and equipment to reduce air emissions. These controls include:

- *The use of water and/or environmentally-safe chemical dust suppressants on roads, open areas, and material handling areas. The application frequency and intensity will be closely monitored and documented.*
- *Equipping the blast hole drill with a combination of water injection, a pneumatic flushing device, and/or a dust shroud.*
- *The use of water sprays on the crushing plant during times it is operating.*
- *The installation and maintenance of a baghouse on the carbon kiln and dore' furnace, which are used in the processing plant as part of the procedure to make dore' bars, the final product.*
- *Maintaining the alkalinity of the sodium cyanide leach solution to reduce fugitive emissions of hydrogen cyanide from the leach pad and processing circuit. Lime will be added to the ore to help maintain the protective alkalinity, and the pH of the leach solution will be checked daily.*
- *The installation and maintenance of a fabric filter on the lime silo to collect the dust emitted during the silo loading process.*
- *The use of drip emitters to apply the process solution to the ore heap to eliminate overspraying and ponding.*

(Continued on Page 2)

- *Burning diesel fuel with a low sulfur content in the generators and heavy equipment.*
- *The proper transport, storage and use solvents or other volatile compounds, such as paints and alkalies so that they will not evaporate, leak or otherwise be emitted into the atmosphere.*

Performance Tests

Yarnell Mining Company will conduct performance tests on the emission control equipment to assure that it is functioning properly. Approved testing methods will be used to check the processing plant baghouse, the crushing plant controls and the generator stacks. Tests will be conducted following initial start-up, and once every two years thereafter. All test results will be reported to ADEQ.

Operations and Maintenance

Yarnell Mining Company will submit a detailed Operation and Maintenance Plan describing the actions and procedures that will be followed to achieve and maintain compliance with the Air Quality Control Permit.

Record Keeping

Yarnell Mining Company will maintain detailed records of all data and support information during operational monitoring.

Need any more information?

The Yarnell Mining Company staff is available to answer your questions. Please feel free to call us at *(520) 427-3353*.

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Fife Symington, Governor Edward Z. Fox, Director

September 8, 1995

H. Mason Coggin, Director
Arizona Department of Mines and Mineral Resources
1502 West Washington
Phoenix, AZ 85007

SUBJECT: PROPOSED YARNELL MINE, YAVAPAI COUNTY

Dear Mr. Coggin:

Thank you for your informative summary of the history of mining in the Yarnell area, and your introspect on environmental mining related issues surrounding the proposed open-pit gold mine near Yarnell. The Arizona Department of Environmental Quality (ADEQ) has received numerous letters from individual citizens and public interest groups regarding this project.

The issues that you raised are issues that will be addressed in the Environmental Impact Statement (EIS) for the Yarnell Mining Project, which is being prepared by the United States Department of Interior, Bureau of Land Management (BLM). The BLM has informed ADEQ that the draft EIS may not even be completed for another year to 1½ years, and there will be opportunities throughout the draft and final EIS process for public involvement. All environmental issues associated with the EIS must be addressed before ADEQ can consider issuing environmental permits that would be necessary for the Yarnell Mining Company to obtain, prior to initiating any mining activities at the site. These permits include aquifer protection (APP) and air quality control permits issued by ADEQ.

At this time, however, ADEQ is only tangentially involved in this project. Since the associated permit applications have not yet been submitted, ADEQ will not take a position or comment on any future proposed permit actions regarding this project.

Consequently, all public concerns are being directed to:

Connie Stone, EIS Project Manager
BLM - Phoenix District
2015 W. Deer Valley Road
Phoenix, AZ 85027
(602) 225-5200

Arizona Department of Mines and Mineral Resources

1502 West Washington, Phoenix, AZ 85007 Phone (602) 255-3795

Toll Free in Arizona 1-800-446-4259 FAX (602) 255-3777

August 09, 1995

Phillip Swift, Editor
The Wickenburg Sun
PO Box 1298
Wickenburg, AZ 85358

Dear Mr. Swift:

TO MINE OR NOT TO MINE

We have received letters from a few people in Yarnell who are opposed to mining and we have had many conversations with other people from the area who are very much in favor of the operation. People opposed to this project have presented only one side of the argument and the conclusions they have made about mining in general and the Yarnell Mine in particular indicate that they have been misinformed. Most of those opposed state they are retired and have moved into the area from an urban environment where they worked and made a living. Now they want to do away with the traditional industries that have supported these rural communities.

There is money and stability generated by an active mine that brings goods and services into the community. Mining towns have a certain vitality that comes from citizens who know they are leading productive lives and providing materials for society. Yarnell is in need of this economic activity as well as the pride and vitality that the Yarnell Mine can provide. Over the years mining has evolved into a high technology industry and our work force is highly trained and educated. They are interested in the development of the community, protection of the environment and the society.

YARNELL IS A MINING TOWN

Yarnell was established as a mining town and mining has supported the community ever since its founding. There have been active mines within a 35 mile radius of Yarnell for well over 130 years and there are still working mines in this radius. Many of the long time residents of Yarnell are either working for a mining company now or have worked for a mining company in the last thirty years. Several mines in the area including the one being considered have produced within this thirty year period and some are still producing. There is a great amount of mineralized ground in and around Yarnell and our society is building on those minerals.

Mining is the second largest and the most reliable industry in Arizona. It supports the government of Arizona and the government of Yavapai County. Many of the rural improvements and services enjoyed by all of the people who live in Yarnell are at least partially paid for by mining operations in Yavapai County. These improvements and services include paved roads, police protection, state, county and federal welfare as well as Social Security, Medicaid and Medicare.

Incidentally, when a mine starts in a community the property increases in value. When Phelps Dodge started the Tyrone Open Pit Mine in New Mexico the price of property in near-by Silver City doubled and some tripled in a matter of days.

BLASTING VIBRATIONS, DUST, FUMES AND NOISE

Blasting, dust, fumes or noise from a mining operation are not generally a problem in a mining community. Many large, well-established towns like Bisbee, Globe, Miami, Morenci and Clifton are a lot closer to a much bigger mine than the Yarnell Mine and the feared effects of blasting, dust, fumes and noise have never been a problem. Modern rock crushers are not a source of either dust, noise or vibration. All of these conditions are regulated and inspected by several state and federal agencies for health and safety and environmental compliance. I doubt that Yarnell Mining Company's crusher will make as much noise in Yarnell as an 18 wheeler on Yarnell Hill and no one seems to be complaining about the highway.

When the Arizona Department of Transportation built the new traffic lane up Yarnell hill in the 1970's they had to blast heavy and blast often. This blasting was closer to Yarnell and closer to the rock garden by several hundred feet than the Yarnell Mine. The heavy construction blasting did not bring the remaining rocks tumbling down the hillside and it is unlikely that the controlled blasting in an open pit on the other side of the road will either. Surface disturbance from blasting has been studied for a long time and the explosives industry has developed techniques for controlling both noise and vibrations. Industry is capable of placing heavy blasts next to high rise buildings in down town New York without damage to the adjacent high rise structures or the utilities. I doubt that the company will be willing to take on the responsible of poor blasting practice.

ROAD BLOCKING

Yarnell Mining Company plans to close the road during blasting. This is probably unnecessary and if it is the operating plan can be amended at a later date with the approval of the various agencies. For the immediate future it will eliminate any perceived danger to traffic on the highway. Most of the traffic stopping rock falls on this road are the result of rain storms. Rock falls from rainfall generally hold up traffic much longer than the planned 30 minute interval. The community at Bisbee, Arizona lived with this condition for many years and it was never a problem. Current delays, during road construction or repairs by the Department of Transportation, between Wickenburg and Wickieup usually last this long and they go on all day.

OLD MINE WORKINGS

None of the old mine workings are below the town of Yarnell. In fact, the old mine workings will be in the proposed open pit. Whether they collapse or not is of no consequence. Having workings below an open pit is not unusual. Most of the open pits in Arizona have old workings below them. In the recent case of San Manuel both the underground and open pit mines were working on the same ore body at the same time.

WATER

Yarnell has had to develop a water source several miles from Yarnell in lands that underlie Peoples Valley. This was done because the local aquifer was not safe to drink and was not large enough to support the community. The mine will develop water from a different aquifer and on the other side of Yarnell. There does not appear to by any hydraulic connection between the two aquifers.

GROUND WATER POLLUTION

The chemicals used by Yarnell Mining are less of a concern than the chemicals used by the citizens of Yarnell. The metallurgical recovery system planned for Yarnell Mining will be similar to the ones used at Congress, Alvarado, Yarnell and other mines in the area over the last 100 years. These operations worked in the area before EPA, ADEQ and other regulating agencies without contaminating the aquifer. This alone should serve as a standing testimony to the safety of this technology.

Yarnell Mining will have to design for a zero discharge facility and this design will incorporate several redundant protection and monitoring systems. Compliance will be monitored carefully by several state and federal agencies including ADEQ, EPA, DWR and many others. The mine will have to account for every gallon of water and every pound of chemical they use. County, state and federal governmental agencies including, the Arizona State Mine Inspector, the federal Mine Safety and Health Administration, the Environmental Protection Agency, the Arizona Department of Environmental Quality, the Department of Water Resources, the US Fish and Wildlife Service and the Arizona Game and Fish Department will be monitoring and regulating the Yarnell Mining operation with great zeal. Over the last two decades mining has become the second most regulated industry in the United States, second only to nuclear power.

Yarnell has no sewer system. The community is underlain by rock covered by a very thin and very shallow layer of gravel. Septic tanks deliver all of the toxins used or produced by the people of Yarnell into a thin shallow aquifer where it eventually gets back into the basin where Yarnell gets its water. Any thing flushed, washed down the sink or sprayed on the ground by the residents of Yarnell will eventually end up in Yarnell's water supply.

The mine will use a state approved collection system to recover and reuse the water and chemicals used in their processing plant in accordance with Arizona's Aquifer Protection Act. At the end of operations all of the chemicals used in the mining operation will be collected, neutralized and continually monitored after closure until the ADEQ is satisfied that all of the toxins have been removed. Process water, will be evaporated. Permitting by ADEQ and other agencies will also require the mine to treat their sewage waste separately.

CANADIAN MINING COMPANY

Many small mining companies have gone to Canada because the financing laws in the United States are not designed to handle mining investments. The Canadian Stock Markets know the mining industry and they understand the inherent risks of this business. The U.S. has done every thing but outlaw raising money for natural resource ventures by regulations made and enforced by the Securities and Exchange Commission. Until the United States becomes more realistic in it financial regulations the rest of the world will have to support our mines and produce our minerals and metals. In the meantime we will have to green up America with money from our trading partner to the north.

I hope that this explanation will calm your concerns.

Sincerely,

H. Mason Coggin
Director

CC: Mailing List

Assuming that all of the environmental concerns, such as you mentioned, are addressed, the required ADEQ permits would only provide controls on the design, construction, operation, and closure of the mine, to minimize the potential for environmental damage to the surrounding natural resources.

Although both of our agencies recognize that federal laws are outside the control of state government, both will be affected by siting of this facility on federal land, and both will undoubtedly also be reviewing and commenting on the EIS for this proposed project. I hope that the EIS process will address all of the concerns indicated in your letter, and I am sure that Ms. Stone would be interested in your comments and level of interest.

Should you be interested in reviewing design details contained within the APP application when it is submitted, please contact Shirin Tolle of my staff at 207-4622. Ms. Tolle, of the Aquifer Protection Program's Mining Unit, has been designated as the project officer responsible for managing the APP process for this proposed facility.

I appreciate your mutual interest and environmental concern.

Sincerely,

Kimberly W. MacEachern
Director
Water Quality Division

KWM:ALR:lla

cc: Karen Heidel, ADEQ Acting Director
Connie Stone, BLM - Phoenix District
Shirin Tolle, WQD/APP Mining Unit

YARNELL MINE YAVAPAI COUNTY

NJN WR 7/17/81: Dwayne Grey (~~Gray?~~) was in and invited anyone from the Department to visit the cyanide leach operation he has set up at the Yarnell mine, Yavapai County.

+

KAP WR 9/18/81: Bill Fellows reported the Yarnell #1 mine is shut down.

KAP WR (10/9/81) Dwayne Grey, 6212 South 75th Avenue, Lavene, Arizona, office phone 243-2538, answering service 254-7703 reported he is going to put a second lift on the leach pad at the Yarnell Mine. The lift is expected to contain 35,000 tons of ore.

KAP WR (10/16/81): At the Yarnell Mine air track drilling was in progress on the west side of the hill above the highway.

KAP WR 12/4/81: Jade Mining Company is reported one of names of the group which is or was recently operating a cyanide heap leaching operation at the Yarnell Mine, Yavapai County.

NJN WR 3/1/85: Archie Stutenroth (c) reported that some one (named Yanowski?) had been diamond drilling and are now operating a small mill at the Yarnell Mine (f) Yavapai County.

Arizona Department of Mines and Mineral Resources
Verbal Information Summary

Mine: Yarnell
County: Yavapai
Location: T10N, R5W, Sec. 14

Date: March 21, 1995
Engineer: Nyal Niemuth

CORPORATE OFFICE
BEMA Gold Corporation
510 Burrard Street, #1400,
Box 48, Vancouver,
BC V6C 3A8
Phone 604-681-8371

Yarnell Mine
Mark Montoyo, Project Manger
Yarnell Mining Co., Subsidiary of BEMA
P.O. Box 1182
Yarnell, AZ 85362
Phone 520-427-3353
FAX 520-427-6404

BEMA through its Arizona subsidiary Yarnell Mining Company has opened an office at Yarnell. Address and phone as above. This office has begun the permitting process for the Yarnell deposit. In December 1994 a plan of operation was submitted to the BLM to initiate the NEPA process to start the Environmental Impact Statement (EIS). In February 1995 they submitted their applications to Arizona Department of Environmental Quality to obtain an Aquifer Protection Permit. They have been gathering baseline data during the last couple of years following completion of a feasibility study. They hope to be able to begin construction of the mine and leach facilities in about 18 months.

Mr. Zdruff CR 75496
Wants to contact Bearup

YARNELL MINE
(Martiney)
OCTAVE (WEAVER) DISTRICT, YAVAPAI CO.

2-27-62

Mr. Bearup stated that he and his associates now had an option on the Yarnell Mine.

Memo - Lewis A. Smith - interview with John T. Bearup, 2414 W. Madison Ave.

Called John Bearup. He said Santa Fe R.R. has a microwave station on the top of the mountain on the claims. I then called Santa Fe and was told they had 2 acres on the north end of the claims. Present owner is Robert W. Brown, 3628 East Fairmont Avenue, Phoenix. No activity at this date. FTJ 5/16/73

JHJ's Memo May 31, 1979 - Went to Yarnell Mine - new buildings above old mill site. No one around. Equipment on a trailer on road to tailings dump included Traylor gyratory, IR gyro compressor, two generating plants, steel chutes, parts of two different size conveyor belts. Mr. Curtis Ritter worked in this mine as a mucker and miner. He also operated an incline hoist and drove an ore truck. He believes recoveries were very low in the earlier days of mining and grade being very good. 6/27/79 a.p.

KP/WR 1/21/80 - The Yarnell Mine, although viewed from across the canyon, shows signs of activity. Equipment on the property includes a trommel, compressors, generator, and vibrating screen. The tailings might warrent sampling.

Duane Grey reported that he is involved in establishing a cyanide heap leaching operation at the Yarnell Mine, Yarnell District (Martinez District ?), Yavapai County. The pad capacity will be 50,000 tons of ore and system will use a carbon recovery circuit.

RRB WR 5/1/81 - Jack Pierce was in to look up the Alvarado. He reports that Duane Gray & Ed Kane of Kane Steel Co., New Jersey are starting a 50,000 ton leach pad at the Yarnel Mine. Jeff Hardin is their Arizona front man.

YARNELL MINE AND MILL

YAVAPAI COUNTY
MARTENIZ[illegible] DIST.

Oro Flame Mining Company has recently arranged for the purchase of the Yarnell Mine and Mill from the Winslow Gold Mining Co. Some changes will be made in the mill to treat Ora Flame ore and the plans are to haul the ore there for treatment. As soon as the mill is ready production is expected to get under way.

Taken from report by Mark Gemmill, Jan. 7, 1953 in Ora Flame Mine file.

Report on
Mining and Milling Operations
at the Yarnell Mine
Oct.29th - Nov.10th 1941

MILL

The results of my close check of sampling and assaying of heads and tails for the mill run from October 28th to November 2nd inclusive are tabulated below :

Table 1

Date	Heads	Mine Assays		Herr Assays	
		Tails Pulp	Tails Sol.	Tails Pulp	Tails Sol.
Oct. 28	$ 2.52	$ .28	$ .062	$ .49	$ .0875
29	3.15	.42	.035	.42	.0437
30	2.55	.28	.052	.35	.0612
31	2.73	.28	.035	.35	.0612
Nov. 1	4.27	.21	.042	.32	.0875
2	9.17	.28	.042	.32	.0612
Average		.292	.045	.375	.067

Duplicate samples of washed pulp tails and of tail solutions were taken to Mr. John Herr at Wickenburg for an assay check on mine figures. As will be noted these check within reasonable limits, and an average of the two sets of figures gives pulp tails for the period : 33.3¢ per ton, and tails solution : 5.6¢ per ton, or a total tail of 38.9¢ per ton (final plant discharge pulp ratio is 1:1).

Samples taken throughout the circuit on October 29th assayed as follows :

Heads	$ 3.15
No.1 Thickener overflow	.68
No.1 Agitator discharge	1.68
No.2 " "	1.97
No.2 Thickener overflow	.52
No.3 " "	.20
No.4 " "	.05
No.5 " "	.035

Assuming pulp tail value at $.33 per ton (the average in

table 1) :

Dissolution total	$ 2.82	($3.15 - .33)	
" in agitators	1.29	(1.97 - .68)	45.7%
" in ball mill	$ 1.53		54.3%
			100.00

And

Dissolution in No.1 Agitator	-	$1.00	- 35.5%
" in No.2 "	-	.29	- 10.2%
			45.7%

It will be seen from the above that somewhat over one half of the dissolution took place in the ball Mill and that further dissolution was effected in a satisfactory manner in the agitators;and the assays of thickener overflows indicate that the washing out of the values was effectively accomplished.

Screen analysis of a washed tailing pulp sample gave the following results :

Table 11

Mesh	Wt. %	Value per ton
- 48	4.9	$ .45
- 48 - 65	10.5	.35
- 65 - 100	15.2	.45
- 100 - 200	22.6	.42
- 200	46.7	.42

Since these results indicate approximately the same values in each of the sizes it is obvious that there is no advantage in holding the material in the mill for a fine grind. A coarser grind would of course increase the amount of oversize and eventually a point would be reached where extraction would be adversely affected. In this connection it should be noted that the degree of fineness which gives the highest extraction is not necessarily the best practice. The economics of the problem impose consideration of other factors such as tonrage, grade and character of ore, unit

cost etc.

I note that the assay control sheets at the mine are in reasonable balance i.e. value of production calculated from estimated tonnage and assays of heads and tails checks with value of production calculated from solution tonnage and assays of solution in and out of the precipitation department, and, further, these figures check within close limits with returns from shipments of gold bars. With this in mind together with the checks indicated in Table 1 it is safe to assume that the mine records are correct and I am listing below the monthly performance for this year to date :

Table 111

Month	Tons	Heads	Tails Pulp	Tails Sol.	Total Tail.	% Recov.	Running Time %	Tonnage Rate (100% Running Time)
Jan.1941	2426	$4.52	$.41	$.16	$.57	87.4	87.9	89
Feb. "	2352	4.43	.37	.12	.49	88.9	93.5	90
Mar. "	3417	4.15	.41	.20	.61	85.3	97.7	113
Apr. "	3512	3.43	.46	.12	.58	83.1	98.1	119
May "	3589	4.10	.36	.14	.50	87.8	90.3	128
June "	3563	4.78	.50	.15	.65	86.8	90.7	131
July "	4081	4.88	.48	.08	.56	88.6	99.4	132
Aug. "	3999	4.28	.38	.06	.44	89.7	97.4	132
Sept. "	3640	3.65	.26	.06	.32	91.2	85.1	142
Oct. "	4256	3.75	.26	.07	.33	91.2	83.3	165

Shortage of ore in the mine is accountable almost entirely for the low running time over most of this period. I have calculated a daily tonnage rate for each month based upon 100% running time and this shows a progressive increase todate. In September and October stoppages due to mill repairs and adjustments were unimportant and if the mine had been able to supply the full requirements of the mill tonnages would have been 4277 tons and 5109 tons respectively.

Mill recoveries in the above table show a marked improvement during the later months in spite of a decline in the value of the ore handled and a substantially higher tonnage rate through the mill. In any ore there is a more or less constant unextractable value regardless of the grade and it is therefore more difficult to show a good recovery on low grade material. Also, frequent shut-downs waiting on ore and wide fluctuation in value of mill feed (I noted recent extremes in daily mill heads of $9.17 and $1.90) are factors not favorable to highest efficiency in the mill. Densities and pulp levels are closely checked and routine colorimetric tests are made on barren solution, and alarm signals have been installed at critical points in the plant to warn the operators of conditions requiring immediate attention.

I understand that at infrequent intervals trouble due to sliming of the tanks has been experienced. This is directly traceable to a preponderance of clayey material in the mill feed at the time. The ill effects of this condition can be somewhat minimized by alert attention and action on the part of the operator, but the best manner for overcoming the difficulty will be found in a closer control of the mine output so that this sort of material does not reach the mill unmixed with other ore having better settling characteristics.

I believe that mill results will continue to show improvement particularly when conditions in the mine will permit of a constant delivery of ore of more uniform grade and character.

The mill has demonstrated its ability to handle around 165 tons per day with a satisfactory recovery. It is my opinion

that a somewhat larger tonnage could be pushed through and that there is justification for doing so. Settling tests and the action of the thickeners indicate that the treatment department has capacity for substantially more tonnage without seriously affecting recoveries, and as I have said before this matter of desired recovery must be viewed in the light of the economics of the situation as a whole. Just how much more tonnage can be handled is a matter which can be determined only by trial when the mine is able to make a larger sustained output. It seems likely that 15 or 20 tons more per day could be handled without making any changes in the plant. Beyond this point pumping capacity for the thickener would have to be increased and probably some addition would be necessary in the clarification department. Also, consideration would have to be given toward replacing the classifier by one of larger size. The efficiency of the present classifier is low and of course would be lower still if called upon to handle a heavier load. Except for the classifier these items would not run into any serious expense.

Personnel in the mill comprises the following :

1 Foreman
2 Crushermen
3 Operators
1 Mechanic's Helper
1 Oiler
1 Tailings Disposal
1 Assayer and Metallurgist

The Foreman handles all mechanical and electrical installation and repair in the mill and performs these same duties in the mine. The Assayer takes care of assaying and melting and metallurgical details in the mill and in addition does the sampling and assaying, and engineering and geological detail for the mine.

A complete cost accounting system has not been set up and all items of expense do not pass through the mine office. The essentials of direct operating cost however have been gathered and these show a cost of $.88 per ton milled for the month of October divided as follows :

	Total	Per Ton	%
Labor	$ 1591.36	$ .374	42.6
Power	1030.00	.242	27.6
Supplies	1116.85	.262	29.8
	$ 3738.21	$ .878	100.0

An increase in the tonnage milled would not require any additional labor expense. Power and supply cost would be higher though not proportionately so. Capacity operation therefore would result in a lowering of the above unit cost.

MINE

The mine suffers seriously from under development and has been unable except at intervals to supply the full requirements of the mill. Dependence for ore supply for the past several months has been placed upon stoping in one short ore shoot on one level supplemented by material from development. This latter material is derived from the winze and other development in the footwall at some distance from the fault, and from drift headings in the vein beyond the limits of the ore shoot. While much of this material runs down to $1.50 per ton in value it will nevertheless mill out at more than the milling cost and when the mine is unable to supply the mill at capacity with good ore it is sent through in order to partially pay its cost of removal from the mine. Under the circumstances this is good practice. I should like to emphasize the

fact however that the proper procedure would be to carry development well in advance of ore extractions and thus be able to furnish the mill at capacity only with profitable material. Waste and low grade could be discarded and marginal material stock piled for milling at some future time if conditions should warrant.

The vein is a fault plane in a mineralized zone with the best values lying near the fault, and values extending into both walls in diminishing amounts for a considerable distance. The greatest penetration appears to be in the footwall where in places pay ore extends for distances of 30 to 40 feet from the fault. The footwall limit of the ore is irregular and is an economic one which can only be determined by the limits of pay while mining the ground.

The fault seam is characterized by a heavy band of gouge and crushed vein matter and since it lies at an angle flatter than 40 deg. the problem of removal from the stopes is a difficult one. It is impossible to carry large open stopes because of the danger from caving of the roof, and the grade of the ore will not permit of the use of an expensive timber and fill system. On the 100 Ft. Level the ore body has been mined by a series of narrow stopes rising to the main level above. Considerable ore is left in these stopes in the form of pillars and material which has caved out of the hanging wall. Also, the floors in most cases are still in ore. When this level was opened up the mill was crowding the mine for ore and expediency rather than choice dictated the system of mining. It is proposed to recover the balance of this ore by breaking and caving into a series of footwall raises and one of these raises is now being driven from the footwall drift with this end in view. In a

system of this sort it will not be possible to effect a complete recovery of the ore as some of it will have to be left for support of the workings, and some dilution must be accepted from caving of the hanging wall beyond the limits of pay ore. Fortunately pay ore generally extends for a considerable distance into the hanging wall and beyond the limits of pay the ground is not pure waste. For fullest efficiency stope preparation should be planned and carried out in advance of mill needs.

During the period of my visit mill heads were quite low reflecting the fact that the ore from the few working places in the stope above the 100 ft level has dropped in grade and a larger proportion of mill feed was coming from development of the winze, the footwall drift and the west drift on the 100 ft level (see accompanying sketch).

The foot wall drift and the first raise from it ought to be producing a good grade of ore within the week.

The winze has reached the 200 ft point and a cross-cut is now being driven toward the hanging wall which should reach it at 35 - 45 ft. It is reasonable to expect that this new level will find the ore shoot with about the same characteristics and values as on the level above. It will be a month or more however before the level is opened up to the point of producing any great amount of ore.

The west drift on the 100 ft level is being driven to develop the vein in the vicinity of the Triangle and the Human shafts. The face of this drift is now in low grade material and apparently has passed beyond the western edge of the ore shoot. The ore shoots in

the mine appear to rake up from the west and conditions higher up in the mine indicate that the area immediately ahead is likely to be lean. At approximately 300 feet from its present face the drift will reach the Triangle shaft and another 250 feet will connect with the Human shaft. These shafts are inaccessible at the present time. Both of them have produced ore in quantity in the past and judging from old records and assays of the dumps the prospect for opening a sizable shoot of ore of better grade than that now being mined seems excellent. There are numerous other attractive surface showings and deeper workings in this western portion of the property which deserve exploration.

Direct mine cost for October was $1.51 per ton divided as follows :

	Total	Per Ton	%
Labor	$ 4866.96	$ 1.14	75.5
Power	338.24	.08	5.3
Supplies	1214.29	.29	19.2
	$ 6419.49	$ 1.51	100.0

I believe that the above costs will continue about the same over the next several months. Ore breaking cost will be lower when the foot wall raises and the 200 foot level open into ore but this reduction will be offset by the increased rate of development which should be undertaken throughout the mine. I note that in October the output of the mine was made with a daily average crew of 30 men or at the rate of better than 4½ tons per man shift.

It will be necessary soon to make additions to mine equipment. Among the more important - A heavier hoist for the winze; A mucking machine for the 200 foot level development; A battery

locomotive for the main level haulage. These items will all pay for themselves in economies effected within a short time.

CONCLUSION

The mill is being operated efficiently and is making a satisfactory recovery.

Costs appear to be well in hand, and duty per man in both mine and mill is high, considering the type and size of operations.

The chief problem at the property is in the mine where development has not kept up with demands of the mill. The ore is low grade and must be handled in volume. It is therefore imperative that the lag in development be caught up and development continued on a scale with ore extraction; and when this is done I see no reason why the property should not operate at a fair margin of profit from this time forward.

T.P. Lane, E.M.

Wickenburg, Ariz.
Nov. 18th 1941

YARNELL MINING COMPANY

February 19, 1998

LETTER TO PROJECT SUPPORTERS

RE: Yarnell Gold Project - Yavapai County, Arizona

Dear Supporter:

Enclosed is some material regarding the Yarnell Mining Company's proposed gold mine project. Your support has been important to our success thus far, and as we move into our permit approval process your help will be even more critical.

As you may know, The Yarnell Mining Company is part of an international corporation that has extensive experience in gold extraction and mine reclamation. Bema Gold Corporation has achieved wide recognition for its use of state-of-the art extraction technology and its commitment to reclaiming the land once the extraction process is completed. In the brochure there is a good summary of an Idaho project, similar to the one we are proposing near Yarnell.

The Yarnell Mining Company has been working on this project since 1994. If all the regulatory approvals are received, we expect to begin construction by the fall of this year.

The mine will employ about 90 people during full-scale production and will operate for six years. Salaries and benefits will generate more than $3 million each year. Another $3.5 million will be paid annually for products and services, and a total of $12 million will be spent on capital costs during the life of the mine.

We are now in the final stages of permitting the mine. A number of activities are occurring this spring, and we want to make you aware of them so you can demonstrate your support to the government agencies involved.

The Arizona Department of Environmental Quality (ADEQ) has announced its intent to approve both the Aquifer Protection Permit and the Air Quality Protection Permit. The ADEQ will conduct a public meeting and formal hearing concerning these two permits on March 2, 1998. We would welcome and encourage your attendance and supportive comments at this time. They will be held at the:

Wickenburg Community Center
155 N. Tegner Street
9:00 a.m. to 7:00 p.m.
(Open-House Format)

23391 S. Highway 89, P.O. Box 1182, Yarnell, Arizona 85362 Tel: (520) 427-3353 Fax: (520) 427-6404
A Subsidiary of Bema Gold (U.S.) Inc.

We have enclosed two fact sheets which provide specific information on our proposed air and water quality protections for your reference.

Written comments can be submitted to ADEQ until March 16. These comments can be sent to:

Mr. Tony Bode, Project Officer
Water Permits Section
Arizona Department of Environmental Quality
3033 N. Central Avenue
Phoenix, AZ 85012

Since part of the project would be located on federal lands, the Bureau of Land Management (BLM) has taken the lead with other federal agencies to study the proposal, and is preparing a Draft Environmental Impact Statement. This comprehensive analysis of the project's environmental effects should be published this spring, and public hearings held later to discuss the draft report. We will alert you when the hearings have been scheduled and would again welcome your attendance and supportive comments.

We believe we have a very solid proposal that is both economically sound and protective of the environment and neighboring community. If you have any questions or would like a tour of the site, please call me at (520) 427-3353.

We also would be pleased to make additional copies of our material available to any other residents or speak to any local groups. We appreciate your continued support and look forward to being an active part of the Yarnell community and the Arizona mining industry.

Sincerely,
for **Yarnell Mining Company**

Mark Montoya
Project Manager

MAM:cgm

Enclosure(s)

Yarnell Mine (f)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Phoenix District Office
2015 West Deer Valley Road
Phoenix, AZ 85027

In reply refer to:
3809 (024)
AZA-29237

September 27, 1995

Dear Interested Party:

The Bureau of Land Management (BLM) has received a mining proposal for the development of an open-pit gold mining operation near the town of Yarnell in Yavapai County. The Yarnell Mining Company, a subsidiary of Bema Gold (U.S.) Inc., has submitted a preliminary Mining Plan of Operations, currently being reviewed by the Phoenix District Office. The BLM will prepare an environmental impact statement (EIS) to analyze the environmental and socioeconomic impacts of the proposed mining operation, and to consider potential mitigation measures to minimize any adverse effects. No decision on the mining proposal will be made until the EIS is completed.

You are invited to attend the public scoping meetings that will be held so that the public can participate in identifying appropriate issues for the BLM to analyze during the preparation of the EIS. The enclosed scoping statement provides background information on the mining proposal, presents a listing of potential issues that may be addressed in the environmental analysis, and describes the public scoping process.

Three public meetings will take place in mid-October in Wickenburg, Yarnell, and Prescott. The enclosed scoping statement describes the agenda for the meetings. We welcome your attendance at the following locations:

October 17, 6:00 p.m. - 9:00 p.m.
Wickenburg Community Center
160 N. Valentine St.
Wickenburg, Arizona

October 18, 6:00 - 9:00 p.m.
Yarnell Senior Citizens Center
136 Broadway St.
Yarnell, Arizona

October 19, 6:00 p.m. - 9:00 p.m.
Prescott Resort Conference Center (formerly the Prescott Sheraton)
1500 Highway 69
Prescott, Arizona

If you are unable to attend one of the meetings, you can also participate by sending a written comment to us by November 20, 1995.

PUBLIC SCOPING MEETING AGENDA

6:00 p.m.	PRELUDE	Attendees sign-in; opportunity to review maps and displays.
6:20 p.m.	INTRODUCTION	Introduction and welcome by meeting facilitator; discussion of meeting format and goals.
6:30 p.m.	WELCOME	Welcome by BLM area manager.
6:40 p.m.	EIS PROCESS	Description of EIS process by BLM project manager.
6:50 p.m.	DESCRIPTION OF PROPOSED PROJECT	Description of proposed Yarnell Project by Yarnell Mining Company representative.
7:10 p.m.	GENERAL Q & A	Opportunity for attendees to ask general questions on material presented by previous speakers.
7:30 p.m	OPEN HOUSE	Opportunity for attendees to identify scoping issues and express concerns at the specified stations.
9:00 p.m.	ADJOURNMENT	Facilitator and BLM will adjourn meeting and review public participation process and scoping comment time frames.

The mining operation would cover approximately 160 acres. The pit would be located primarily on private (patented) land, with processing and ancillary facilities located on private lands and BLM-administered public lands. The area of disturbance would include approximately 92 acres on public land and 68 acres on private land.

Mining facilities, as proposed, would include the open pit; two or more waste rock dumps; haul roads; an ore crushing plant; a heap leaching facility, including a leach pad and collection ponds; a processing plant; and warehouse, laboratory, and office buildings. Figure 2 depicts the proposed placement of facilities. The mine would operate with approximately 90 employees.

Yarnell Mining Company proposes to obtain its water supply from an existing well on its private land and from the Antelope Creek Basin, approximately two miles southeast of the proposed project area. Exploratory drilling will be conducted to determine the sufficiency of this potential water source. The EIS will include an analysis of impacts that would be associated with the use of water sources.

The mine would be in operation for six years, with an additional two years for reclamation. Proposed reclamation activities would include closure of the facilities, the removal of buildings, neutralizing of the heap leach pad, pond removal, stabilizing of slopes, and revegetation.

The Environmental Impact Statement Process

BLM is the agency responsible for preparing the EIS on the proposed Yarnell Project. An interdisciplinary team of BLM personnel has been formed to guide preparation of the EIS. A consulting firm, P.M. De Dycker and Associates, Inc., will assist BLM in the preparation of the EIS.

The identification of significant environmental issues related to the proposed action, by BLM, other governmental agencies, and the public, is called scoping. The environmental analysis phase of the EIS will begin after scoping is completed. The Draft EIS will present an analysis of the physical, biological, and socioeconomic effects of the proposed project and its alternatives. After publication and distribution of the Draft EIS, projected to take place sometime in mid-1996, BLM will solicit public comments on the draft document. A Final EIS will address all substantive public comments.

Nature of Decisions to be Made

The EIS will disclose and analyze impacts and make recommendations on alternatives and mitigation measures developed to reduce any adverse impacts. The environmental analysis will be used by BLM in making a decision on the proposed mining project. The Yarnell Mining Company holds valid mining claims on public land

and has rights under the Mining Law of 1872 to develop these claims. The use of the subject lands for mineral operations is in conformance with BLM's resource management plans. The decision to be made is whether to approve the implementation of a proposed plan that meets BLM's requirements as well as other legal requirements; whether to approve an alternative to the proposed plan; or whether to reject the proposed plan. In making this decision, the following determinations must be made:

1. Determine if the proposed actions are in conformance with BLM policies, regulations, and approved land management direction, including the requirements of the Federal Land Policy and Management Act of 1976.

2. Determine if any additional mitigation, management restrictions, or monitoring requirements are needed if the proposed plan is implemented.

Preliminary Issues

The BLM has conducted a preliminary evaluation of environmental issues associated with the proposed mining operation. Some of these issues were identified as a result of correspondence received from the public. The main issues are summarized below.

Surface and Groundwater Quality and Quantity: Because of the nature of leaching operations, surface and groundwater quality protection is a major concern. Water quantity is also a concern because of limited water resources in the project area and possible impacts to community water supplies.

Air Quality: Atmospheric releases of fugitive dust and vehicular emissions during construction and operations are of interest. The potential drift of cyanide gas from the leach pads is also a concern.

Visual Resources: Visual impacts could result from the proximity of the project to residential areas, highways, and public lands. Visual impacts are a concern during mining operations and after closure and reclamation.

Public Safety: The effects of potential reagent spills and blasting related impacts from fly rock, air pressure and ground vibration are also a concern.

Noise: Mining activities would occur near residences of Glen Ilah and Yarnell, which could be disturbed by these activities.

Biological Resources: The proposed mine could affect vegetation, wildlife use of the area, potentially threatened or endangered species, and use of the area for livestock grazing and other purposes.

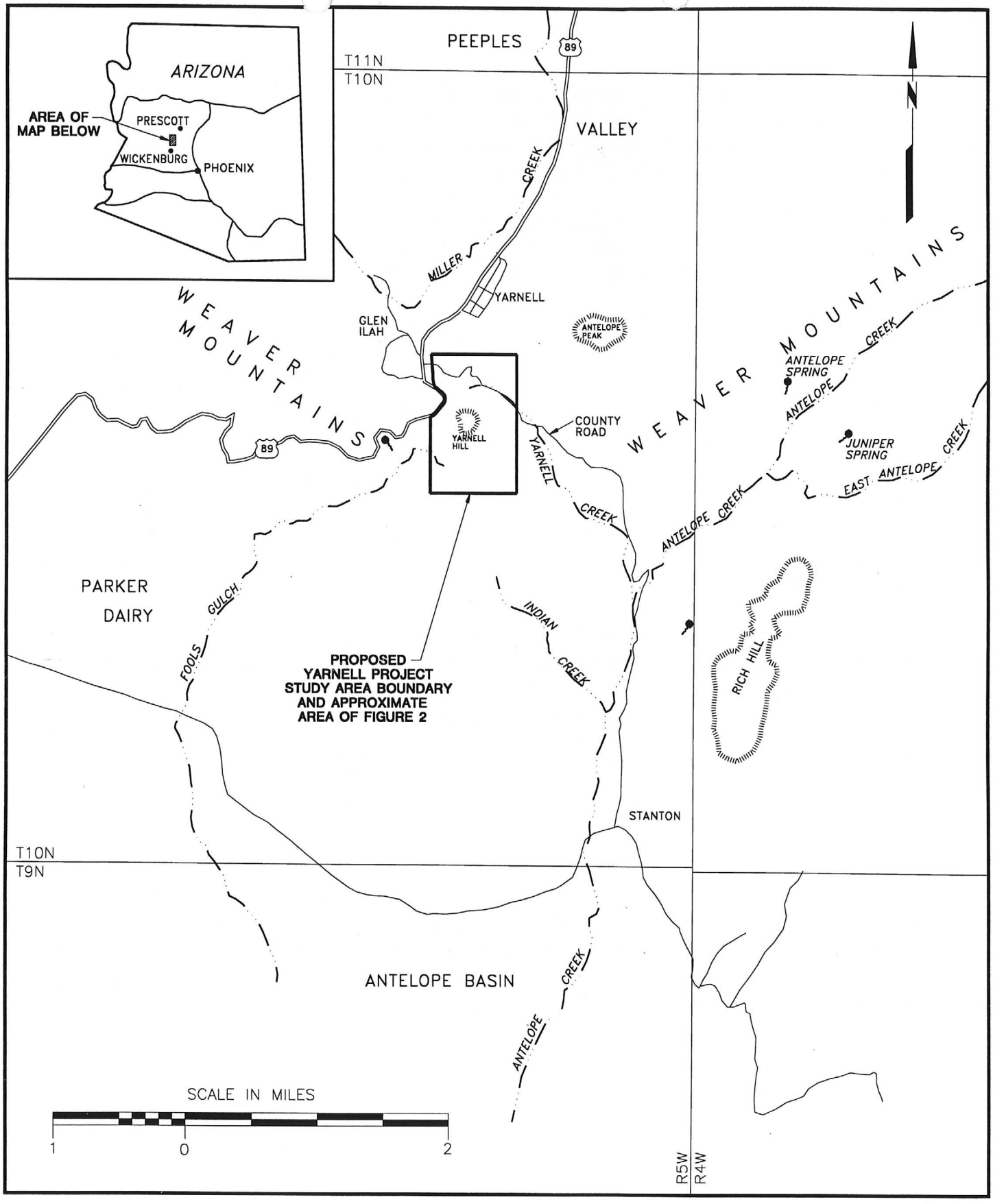


FIGURE 1
PROPOSED PROJECT VICINITY MAP

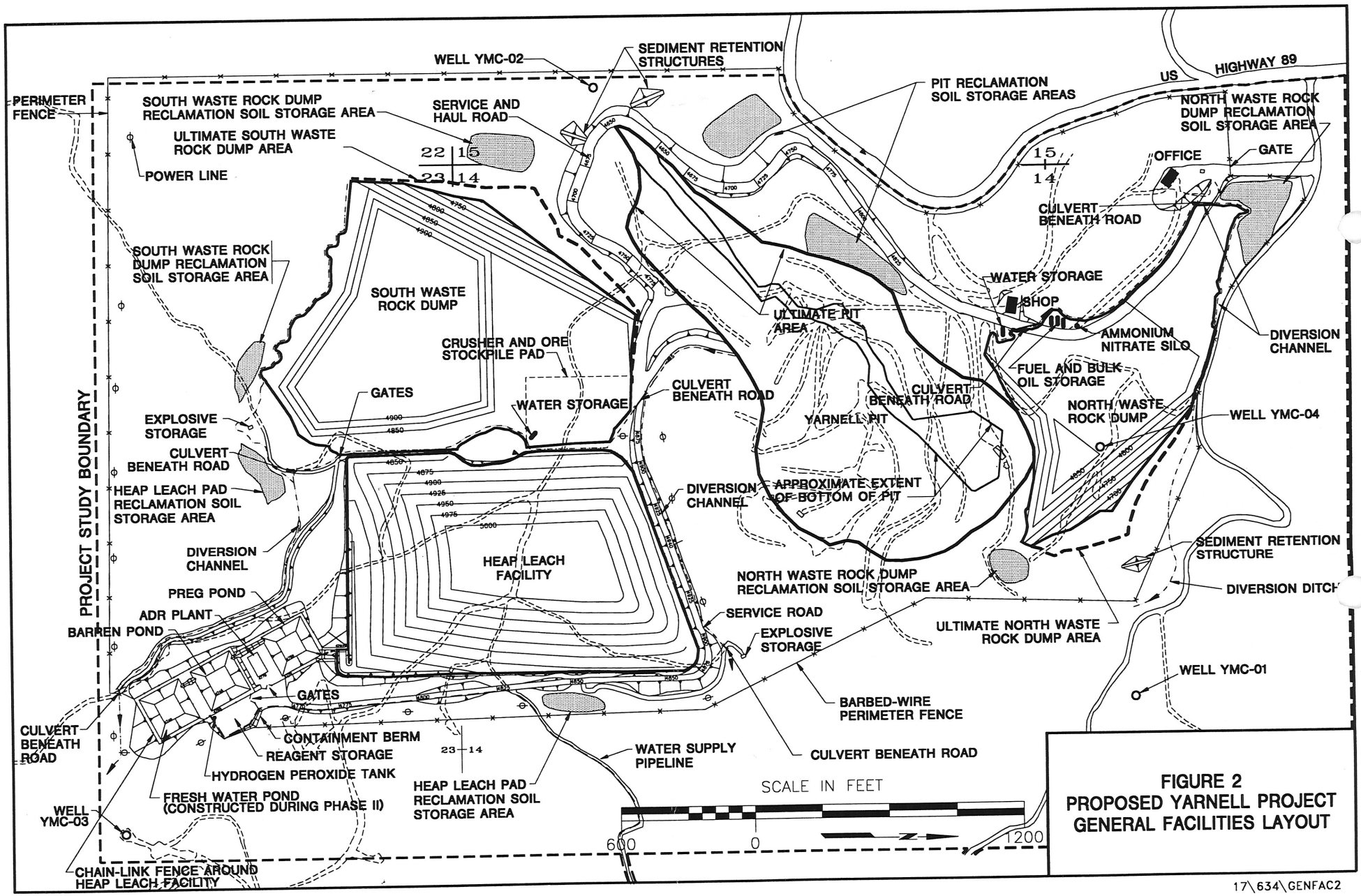


FIGURE 2
PROPOSED YARNELL PROJECT
GENERAL FACILITIES LAYOUT

17\634\GENFAC2

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

FIELD VISIT

1. Mine file: YARNELL MINE
2. Mine name if different from above:
3. County: Yavapai
4. Operational status: Idle
5. Information from: Nyal J. Niemuth and Ken A. Phillips
6. Summary of information received, comments, etc.:

Passed by the Yarnell and stopped along road across the canyon and immediately north of the tailings.

Little recent activity could be detected. Two photographs of hillside showing the location of the mine and tailings were taken. An estimated 50,000 tons of tailings remain in the canyon.

Date: January 19, 1989

Ken A. Phillips, Chief Engineer

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

1. Mine file: YARNELL
2. Mine name if different from above:
3. County: Yavapai
4. Information from: Don Jenkins

   Company: Gold River Resources

   Address: P.O. Box 4106

   Prescott, AZ 86302

   Phone: 778-6160

5. Summary of information received, comments, etc.:

Mr. Jenkins reports he has leased the Yarnell Mine to Norgold. Recent activity on the property has included surface and underground sampling.

Date: November 5, 1988

Nyal J. Niemuth, Mining Engineer

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

1. Information from: Don Jenkins

   Company: Gold River Resources (c)

   Address: P.O. Box 4106

   Prescott, AZ 86302

2. Phone: 778-6160

3. Mine: YARNELL MINE

4. ADMMR Mine File: Same

5. County: Yavapai

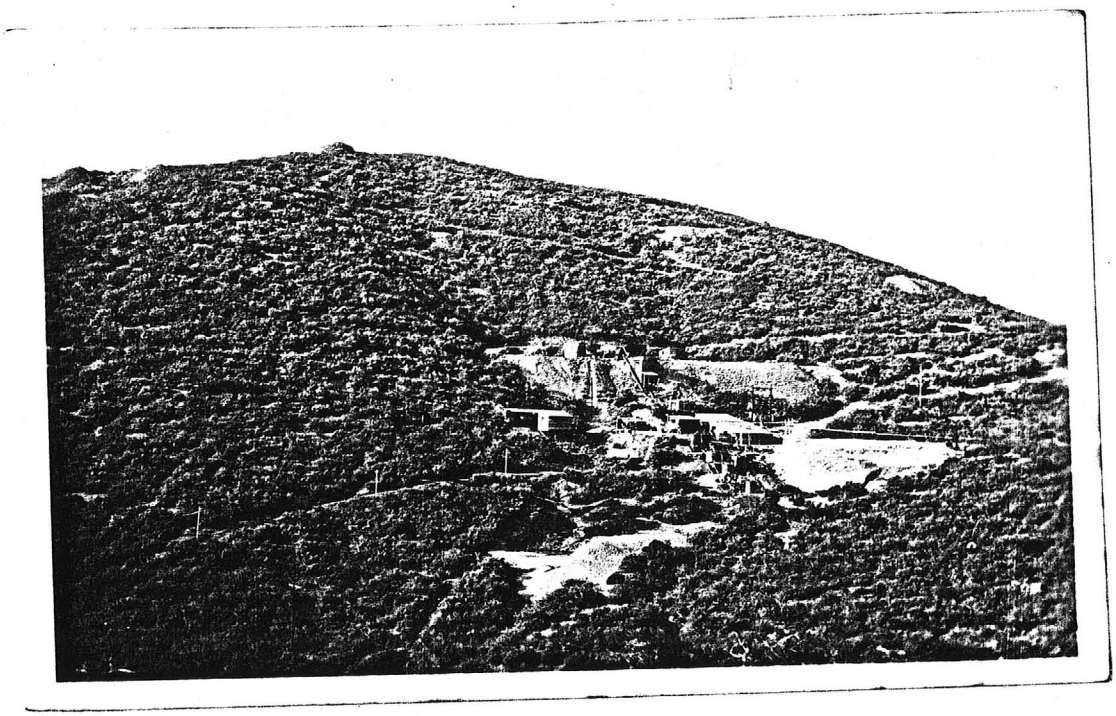
6. Summary of information received, comments, etc.:

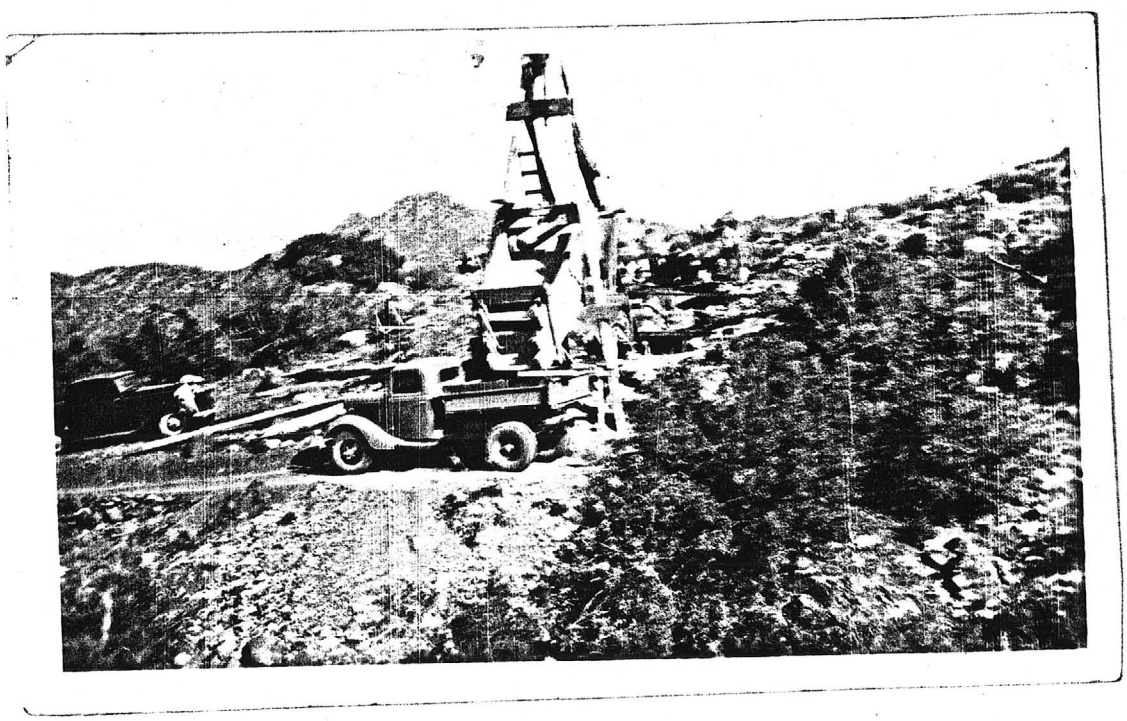
Mr. Jenkins reported that Norgold Resources Inc., Box 2038, 20 Eglinton Ave. W., Toronto M4R 1K8, phone (416) 488-8540 will be conducting a drilling and trenching program at the Yarnell Mine.

Wrong address SAYS WHO?

Date: September 22, 1988

Nyal J. Niemuth, Mining Engineer





YARNELL MINE
1936

LLOYD MOULTRIE - OWNER
J. ROSS CASTENDYCK - MANAGER

A - site as a cyanide operation - Nov 82

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Yarnell Mine

Date July 20, 1981

District Martinez District

Engineer John H. Jett, Director

Subject: Mine Visit

Visit was made to the Yarnell Mine. Mr. Duane Gray, Manager, was not present. He had taken a Cat to a mine site approximately 8 miles out of Wickenburg to start up a heap leaching operation.

The Yarnell Mine is operating. The "heap" was being sprayed with solution. A Mr. Wayne Thomason, in charge in the absence of Mr. Gray, estimated the heap contained between 15-25,000 tons. The catchment basin was empty but Mr. Thomason said some solution was being run through the recovery plant. The ore came from two open cuts on the side of the mountain. The ore on the pad was not crushed.

Several thousand tons of material set at the top of a bank above a portable crushing unit. This ore will be crushed.

There was no activity in the underground workings other than visits in the mine to see the status of the workings. Plans are unknown for future underground work.

From the looks of the equipment on site, the operation appears to be well funded.

Complete Ore Testing
and Assaying
Fire Assaying

SUNDANCE
Metallurgical and
Assay Laboratory

JERRY MAY
Metallurgist

6212 S. 75th Avenue
Laveen, AZ 85339
(602) 243-2538

Jerry L. May
CONSULTING METALLURGIST

Box 14536
Phoenix, Az. 85063

Phone (602) 863-0268
(602) 243-2538

Office Visit 12/2/81 John Jett, Director

card made

Mr. Jerry May stated that he and Duane Grey are partners and are building a plant for their use as a metallurgical and assay laboratory. They are investigating several properties. They are trying to sell the Yarnell Mine. It is presently inoperative. If a buyer is not found in a few months they will start up and operate themselves. Mr. May is from Idaho, but recently worked in Montana on heap leach operation.

YOU ABOUT CARD for Nos?
Jerry

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Yarnell

Date Feb. 17, 1956

District 1 mile south of Yarnell

Engineer Mark Gemmill

Subject: Present Status

The property consists of 4 patented and several unpatented mining claims and is owned by Winslow Gold Mining Co. Yarnell Ariz. Mr. H. A. Funk is President of the Company and lives in Long Beach, Cal. address not available.

The mine was origonally located by Harrison Yarnell prior to 1900. Good gold values were found on the surface. A small stamp mill was installed and the property worked intermittantly for several years. The high grade, free milling ore near the surface diminished as the mine was deepened and it became unprofitable. It remained inactive until the raise in the gold price and was reopened in 1935. A flotation plant of 40 tons daily capacity was installed and several thousand tons of ore mined and milled. Recovery was poor and the operation failed.

Winslow Gold Mining Co. acquired the property in 1939 and installed a modern Cyanide plant of about 125 tons daily capacity. Production commenced early in 1940 and continued until the property was closed in 1942 by order L 208. At the close of the war the property was optioned for a year or two to an outfit who proposed to reopen the mine and put it operation but nothing was done.

There is no reliable information as to the production prior to 1940 and the records since then are not complete. Some of the records and maps were removed by the last lessees and not returned. However in the years 1940-42 some $450,000.00 was received from mint shipments of bullion. About 90,000 tons of ore was treated showing a net recovery of $5.00 per ton. The values were gold with a very little silver. Recovery in the mill about 95%.

The accompanying map was put together in 1953 from such maps as could be found. Assay and working maps were missing. The mine now is reported to be inaccessible. There were several ore shoots along the vein for a distance of about 1000 ft. The main one blossomed at the crest of the hill, was about 200 ft long and from 10 to 20 ft. wide. This orebody furnished most of the ore extracted. On the bottom level it appeared to be somewhat narrower. This level was not fully developed however and as only a small amount of ore had been stoped so it still might show up better.

The mill is still intact on the property but there is no chance of profitable operation of the known ore with present day costs. The price of gold would have to be very much higher to make it attractive.

SURVEY OF OPERATING MINES

By A. C. Nebeker

JUNE 8th, I942.

WINDSLOWGOLD MINING CO.

Winslow Gold Mining Co,
Roy Mitchell President
Winslow, Arizona

H. H. Saum Genl. Mgr.
Yarnell, Ariz.

The Winslow Gold Mines, a group of many mining claims, is located about ½ mile off the main highway on top of Yarnell Hill, and I½ miles south of Yarnell Post Office, Yavapai County, Arizona.

This property is a gold mine and is equipped with a complete mining plant and a mill for straight cyaniding.

The power of 250 H.P. for the mine and mill is furnished by the Arizona Power Company.

There is plenty of water for all operations. The company bought out two ranches for the water right, put down one deep well and made two reservoir lakes, and from this source the water is pumped to the mine.

The vein that has been furnishing the ore is a fault fissure vein with flat dip and traceable for several hundred feet across the property having a width of 30 feet in places.

The principal metals are gold and silver with very little silver, ores go as high as $40.00 per ton, but the average mill feed is $4.00 per ton. The production now is I00 tons per day and this production was maintained during I94I. There has been found a new ore body of much better values than the past ores, and it is planned to step up the mill to I75 tons per day.

The present work going on is developement by drifts, stopping ore and milling, but for the future a main haulage tunnel is planned which will cut the ores much deeper than the present works. New ore bins will be built also more houses.

The mill product is melted into bullion right at the property and shipped to San Francisco Calif.

Wrking conditions are good and 34 men are now employed.

A. C. Nebeker

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine WINSLOW GOLD MINING CO. Date June 8th, 1942

District Yavapai County Engineer A. C. Nebeker

Subject: Suvery of Operating Mines

Winslow Gold Mining Co., Roy Mitchell, President, Winslow, Arizona.
H. H. Saum, General Manager, Yarnell, Arizona

The Winslow Gold Mines, a group of many mining claims, are located about 1/2 mile off the main highway on top of Yarnell Hill and 1-1/2 miles south of Yarnell Post Office, Yavapai County, Arizona.

This property is a gold mine and is equipped with a complete mining plant and a mill for straight cyaniding.

The power of 250 H.P. for the mine and mill is furnished by the Arizona Power Company.

There is plenty of water for all operations. The company bought out two ranches for the water right, put down one deep well and made two reservoir lakes, and from this source the water is pumped to the mine.

The vein that has been furnishing the ore is a fault fissure vein with flat dip and traceable for several hundred feet across the property having a width of 30 feet in places.

The principal metals are gold and silver with very little silver, ores go as high as $40.00 per ton, but the average mill feed is $4.00 per ton. The production now is 100 tons per day and this production was maintained during 1941. There has been found a new ore body of much better values than the past ores, and it is planned to step up the mill to 175 tons per day.

The present work going on is development by drifts, stoping ore and milling, but for the future a main haulage tunnel is planned which will cut the ores much deeper than the present works. New ore bins will be built also more houses.

The mill product is melted into bullion right at the property and shipped to San Francisco, Calif.

Working conditions are good and 34 men are now employed.

PROBLEMS

JUNE 8th I942.

Winslow Gold Mining Co
Yarnell, Ariz.

This company seems to be getting along very well now with no worries. Here a few weeks ago their men were leaving for jobs in the defense works but all came back, as they were not able to do as well on the defense jobs, due to lay offs, higher cost of living, and union dues.

Mr Saum, says, so far, he has had no trouble in getting what supplies he needs, and with what they have on hand, they can get along very well for some time.

W. F. Lebeken

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine WINSLOW GOLD (YARNELL MINE) Date OCT 6th 1942.

District YARNELL Engineer A.C.NEBEKER

Subject: PRODUCTION POSSIBILITIES

There will be no more production for the Duration.

This company lost all its men but one, so folded up its shop.

A.C. Nebeker

13

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Date October 10,1939

Mine YARNELL

Engineer ~~Carl G.Barth,Jr.~~

District Martinez

Location On White Spar Highway one mile south of Town of Yarnell, Arizona.

Former name Same

Owner Held by Norris Estate of Prescott Patterson and Eastvold, Attorneys.

Address Valley Bank Building, Prescott, Arizona.

Operator Winslow Gold Mining Co.

Address Prescott and Yarnell.

President

Gen. Mgr.

Mine Supt. Mark Gemmil

Mill Supt.

Principal Metals Gold

Men Employed 5

Production Rate

Mill: Type & Cap. 150 ton Cyanide Mill in construction

Power: Amt. & Type Purchased Electric

Operations: Present Construction of Complete Continuous Decantation Cyanide Plant. Tank foundations now complete. Ball Mill Foundation being constructed.

Operations Planned Development and Mining of 125 Tons daily.

Number Claims, Title, etc.

Four (4) Patented and several unpatented.

Description: Topog. & Geog.

Property lies on Yarnell Hill with rugghed slopes.

Mine Workings: Amt. & Condition

Several hundred feet of Tunnels, drifts and some shafts.

(over)

Geology & Mineralization

Shear Zone in Granite Porphyry.
Gold bearing Pyrite oxidized near surface

Ore: Positive & Probable, Ore Dumps, Tailings

No information.

Mine, Mill Equipment & Flow Sheet

Road Conditions, Route

Within 1/4 mile of Paved Highway: through route to Phoenix, south and Prescott, north.
Railroad 9 miles distant at Congress.

Water Supply

Drilled Well.

Brief History

An early location having operated with a 10 Stamp Mill some time around 1896. Operated by Yarnell Mining Co. 1936-7 with 50 Ton Flotation Plant. Estimated Production about $ 75,000.00

Special Problems, Reports Filed

Remarks

If property for sale: Price, terms and address to negotiate.

Signed Carl G.Barth,Jr.

Use additional sheets if necessary. Separate sheets on each problem.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Date October 10, 1939

Mine YARNELL

Engineer

District Martinez

Location On White Spar Highway one mile south of town of Yarnell, Arizona.

Former name Same

Owner Held by Norris estate of Prescott Patterson and Eastvold, Attorneys.

Address Valley Bank Building, Prescott, Ariz.

Operator Winslow Gold Mining Co.

Address Prescott and Yarnell

President

Gen. Mgr.

Mine Supt. Mark Gemmil

Mill Supt.

Principal Metals Gold

Men Employed 5

Production Rate

Mill: Type & Cap. 150 ton Cyanide Mill in construction

Power: Amt. & Type Purchased electric

Operations: Present Construction of complete continuous decantation Cyanide Plant. Tank foundations now complete. Ball Mill Foundation being constructed.

Operations Planned Development and mining of 125 tons daily

Number Claims, Title, etc. Four (4) Patented and several unpatented

Description: Topog. & Geog. Property lies on Yarnell Hill with rugged slopes

Mine Workings: Amt. & Condition Several hundred feet of Tunnels, drifts and some shafts.

(over)

Geology & Mineralization Shear Zone in Granite Porphyry.
Gold bearing Pyrite oxidized near surface

Ore: Positive & Probable, Ore Dumps, Tailings

No information

Mine, Mill Equipment & Flow Sheet

Road Conditions, Route Within 1/4 mile of paved highway; through rout to Phoenix, south, and Prescott, north.
Railroad 9 miles distant at Congress

Water Supply Drilled well

Brief History An early location having operated a 10 stamp mill some time around 1896. Operated by Yarnell Mining Co. 1936-7 with 50 ton Flotation Plant. Estimated production about 75,000,00

Special Problems, Reports Filed

Remarks

If property for sale: Price, terms and address to negotiate.

Signed CARL G. BARTH, Jr.

Use additional sheets if necessary. Separate sheets on each problem.

(over)

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Date October 10, 1939

Mine Yarnell

Engineer

District Martinez

Location On White Spar Highway one mile south of Town of Yarnell, Arizona

Former name Same

Owner Held by Norris Estate of Prescott Patterson and Eastvold, Attorneys.

Address Valley Bank Building Prescott, Arizona

Operator Winslow Gold Mining Co.

Address Prescott and Yarnell

President

Gen. Mgr.

Mine Supt. Mark Gemmil

Mill Supt.

Principal Metals Gold

Men Employed 5

Production Rate

Mill: Type & Cap. 150 tons cyanide Mill in construction

Power: Amt. & Type Purchased Electric

Operations: Present Construction of Complete continuous Decantation Cyanide Plant. Tank foundations now complete. Ball Mill Foundation being constructed.

Operations Planned Development and Mining of 125 tons Daily.

Number Claims, Title, etc. Four (4) patented and several unpatented.

Description: Topog. & Geog. Property lies on Yarnell Hill with rugged slopes.

Mine Workings: Amt. & Condition Several hundred feet of tunnels, drifts and some shafts.

(over)

Geology & Mineralization

Shear zone in Granite Porphyry.
Gold bearing pyrite oxidized near surface.

Ore: Positive & Probable, Ore Dumps, Tailings

no information

Mine, Mill Equipment & Flow Sheet

Road Conditions, Route

Within 1/4 mile of paved highway, through route to Phoenix, south and Prescott north.
Railroad 9 miles distant at Congress.

Water Supply

Drilled well.

Brief History

An early location having operated with a 10 stamp mill some tine around 1896. Operated by Yarnell Mining Co. 1936-7 with 50 ton Flotation plant. Estimated production about 75,000.00

Special Problems, Reports Filed

Remarks

If property for sale: Price, terms and address to negotiate.

Signed Carl G. Barth, Jr.

Use additional sheets if necessary. Separate sheets on each problem.

SOCIETY FOR MINING, METALLURGY, AND EXPLORATION, INC.

P.O. BOX 625002 • LITTLETON, COLORADO • 80162-5002

PREPRINT NUMBER

92-190

GEOLOGY AND GEOCHEMISTRY OF STOCKWORK GOLD MINERALIZATION AT THE YARNELL MINE, YAVAPAI COUNTY, ARIZONA

T. C. Page

Reno, Nevada

M. A. Miller

J. D. Sell

Asarco Incorporated
Tucson, Arizona

P. C. Gibson

University of Nevada, Reno
Reno, Nevada

For presentation at the SME Annual Meeting
Phoenix, Arizona — February 24-27, 1992

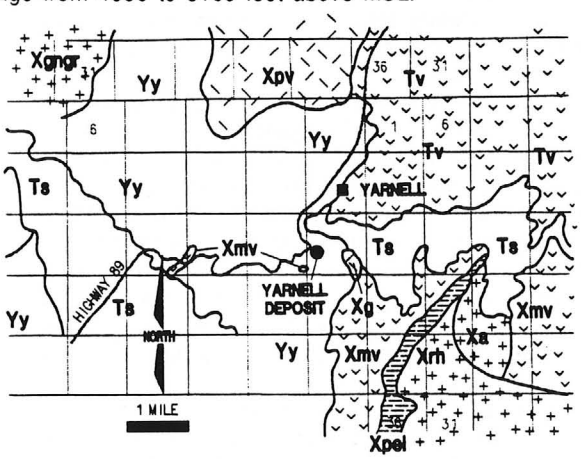
Abstract. The Yarnell gold deposit, located in the Weaver mining district of Yavapai County, Arizona is found within a structurally controlled, hydrothermally altered zone that occurs within a 1700 Ma granodioritic intrusive. Both potassic and sericitically altered rock that occur around and above the low-angle northeast striking Yarnell fault are known to host economic gold mineralization; a wider envelope of weakly-propylitic alterred rock also occurs in this area. During mineralization, strong sericitization accompanied several stages of quartz ± adularia veining, stockwork formation, and localized silicification and potassic replacement, in association with deposition of specularite, pyrite (now oxidized), and gold. The footwall of the fault is also sericitically altered but poorly mineralized. Mineralization along the Yarnell fault continues both northeast and southwest from the main deposit although the thickness of the zone and associated alteration envelope diminish away from the orebody.

A sample of undeformed illite taken from the Yarnell fault zone was K/Ar dated at 69 ± 1.6 Ma; this date reflects a minimum age for both mineralization and latest movement on the fault. Gold mineralization is accompanied by modest increases in Ag, As, Cu, and Mo content. Both CO_2- and H_2O-rich fluid inclusions were studied and suggest mesothermal pressures and temperatures of formation for the deposit.

Ninety-six reverse-circulation holes and four diamond drill holes outline a bulk-minable mineral reserve of 4.1 million tons at 0.051 opt gold. An additional 2.7 million tons at 0.017 opt gold occurs in a low grade zone above and subparallel to the main mineralized zone. Total calculated mineral inventory stands at 6.8 million tons at a grade of 0.038 opt gold with a waste to ore ratio of 1.45:1. Column leach tests indicate that cyanide heap leach gold recoveries should exceed 70%.

Location and history

The Yarnell gold deposit, located in the Weaver mining district on the southwest side of the Weaver Mountains, Yavapai County, Arizona (Fig. 1), is one mile south of the town of Yarnell. Elevations within the area of the deposit range from 4650 to 5100 feet above MSL.



TERTIARY — Ts - META SEDIMENTARY / META VOLCANICS (MIOCENE); Tv - VOLCANICS, PREDOMINATELY BASICS AND ANDESITES (MIOCENE)

PRECAMBRIAN Y — Yy - YARNELL GRANODIORITE

PRECAMBRIAN X — Xg - UNDIFFERENTIATED GRANODIORITE; Xa - ANTELOPE CREEK GRANITE; Xrh - RICH HILL GRANITE; Xpv - PEOPLES VALLEY GRANODIORITE; Xmv - META VOLCANIC ROCKS, EARLY PROTEROZOIC; Xgngr - SYNTECTONIC LEUCO GRANITE; Xpel - PELITIC METASEDIMENTARY ROCKS, EARLY PROTEROZOIC

FIGURE 1. MODIFIED FROM - UNPUBLISHED MAPPING, ED DEWITT 1991

Historic production from the Yarnell deposit was principally from underground but included limited production from the open cut on the top of Yarnell hill. Winslow Mining Company operated the property from 1939 through 1942 and mined the majority of the total estimated production of 200,000 tons. Average grade of the ore was reported to be 0.2 to 0.3 opt gold. The mine closed in 1942 due to the Federal gold mine closure order.

The Yarnell property was leased by Norgold Resources Inc. in 1988 and joint ventured with Asarco in the same year. Asarco drilled 25,662 feet in 96 reverse-circulation and 4 diamond drill holes and identified the gold reserve. Bema Gold Inc. now holds the property as a result of their acquisition of Norgold Resources Inc. in early 1991.

Regional geologic setting

The Yarnell gold deposit occurs within a granitic to granodioritic intrusive body formally called the Yarnell granodiorite by Anderson (1989) and designated the granodiorite of Yarnell by DeWitt (1989). This intrusive outcrops over an area of more than 35 square kilometers and occurs within a sequence of Proterozoic metavolcanics and metasedimentary rocks (DeWitt, 1991; Fig. 1). Xenoliths and roof pendants of country rock are common and probably resulted from stoping and rafting during intrusion. Anderson (1989) describes the Yarnell granodiorite as "a porphyritic granodiorite to monzogranite . . . distinctly coarse-grained and weakly foliated, with large pinkish-tan K-feldspar phenocrysts in an equigranular matrix with biotite, plagioclase, uncommon hornblende, and abundant sphene . . . (that) is metaluminous, high-K, calc-alkaline, high Fe-Ti, and high total-alkali rock". The Yarnell granodiorite has not been dated, but DeWitt (1989) places the age of the Yarnell pluton in the 1730 to 1710 Ma range based on lithologic similarity to other dated granites in Arizona.

Mid-Tertiary flows of andesitic and basaltic composition unconformably overlie both the intrusive and Proterozoic metamorphic rock. Remnants of these flows cap the hills and ridges to the north and northeast of the deposit (Fig. 1).

Local geology

Rock types

The Yarnell gold deposit is structurally controlled and wholly contained within the granodiorite at Yarnell. Petrographic studies by Honea (1990) and Page (1989) were used to identify rock types and alteration characteristics of the deposit.

The granodiorite at Yarnell is generally uniform in composition within the area of the deposit, contains microcline as the dominant K-feldspar, lacks hornblende and is generally granitic in composition. Table 1 compares the major element chemistry of three samples of the Yarnell granodiorite reported by DeWitt (1989) with two samples of relatively fresh granodiorite taken from both above and below the Yarnell fault in the vicinity of the deposit. DeWitt's samples, taken about 1.5 kilometers north of the mine area (#72), 1.5 kilometers to the west (#73), and 8 kilometers distant near the base of Weaver Mountain (#74), although slightly less silicic, are geochemically similar to those samples collected by Malusa (1990) and suggest overall uniformity of composition throughout the Yarnell pluton.

faulting and fracturing allowed influx of hydrothermal fluids through relatively large thicknesses of rock. Specularite and pyrite associated with quartz veins and gold mineralization were apparently formed either from remobilized iron from within the host rock and/or from introduced iron carried by the hydrothermal fluids. Gold mineralization was accompanied by modest increases in Ag, As, Cu, and Mo content.

Successive movements along the Yarnell fault are interpreted to have crushed, sheared, and possibly remobilized silica, iron, and other elements. Quartz lacking secondary inclusions and the presence of undeformed pyrite and pyrite pseudomorphs within the vicinity of the fault suggest that mineralization continued following latest movements on the fault. Lack of shear and/or brecciation within the small amounts of banded chalcedonic quartz combined with its lower temperature countenance suggest that chalcedony deposition occurred following latest fault movements possibly as the hydrothermal system waned. Goethite ± hematite pseudomorphs after pyrite and earthy iron-oxides formed as a result of the influx of meteoric waters after the period of hypogene mineralization. Exposure to meteoric waters may also have resulted in flushing of some of the Ag and most of the Cu that accompanied mineralization from the uppermost parts of the Yarnell deposit.

Inferences concerning the development of the Yarnell fault and source of the mineralizing fluids can be made. The 69 Ma. K/Ar age obtained from undeformed illite (Shafiqullah, 1990) suggests that mineralization and the Yarnell fault structure are of Cretaceous or earlier age. Although fault displacements are unknown due to lack of marker horizons, the pre-Tertiary age of faulting suggests that fault development occurred in response to compressional forces.

Fluid inclusion data currently available for the Yarnell deposit, the general lack of any strong epithermal trace-element content (ie. Hg, As, Sb), combined with a hypogene mineral assemblage compatible with formation at moderate depths and temperatures strongly suggests that ore deposition occurred within a mesothermal environment. The deposition of relatively high concentrations of gold without deposition of more than modest amounts of associated elements suggests that the fluids involved may have been highly evolved. Salinities of 10 weight percent or less are far below those expected from more nearly pristine magmatic fluids yet are higher than salinities common to most epithermal environments. The actual origin of the mineralizing fluids and the source of the gold found within the deposit remains conjectural.

The large variations in composition of the fluid inclusions from the Yarnell deposit are similar to variances described for mesothermal gold deposits in which fluctuations in pressure are thought to have resulted in the unmixing of immiscible H_2O- and CO_2-rich fluids from a CO_2-rich parent fluid (Robert and Kelly, 1987; Goldfarb, et al., 1988). Either unmixing, or fluctuation between dominantly reducing and dominantly oxidizing conditions (as evidenced by deposition of both pyrite and specularite) may have resulted in gold deposition within this part of the system.

The 69 Ma. age determination falls within the period of Laramide metallogenesis which occurred between ca. 75 Ma and ca. 50 Ma. (Titley, 1986) within this region. Laramide intrusives such as the intrusive at Bagdad that occur within the general region may have either provided magmatic components and/or increased geothermal gradients that focused the hydrothermal system. Several of these intrusives are related to precious metals deposits that are peripheral to the intrusive centers (Titley, 1986). The more felsic dikes and sills found within the area of the Yarnell deposit also suggest that Yarnell may be peripheral to a deep-seated intrusive. More work is clearly needed if the actual origin and chemical constitution of the mineralizing fluids, and the physical and chemical processes involved in deposition of gold and other elements is to be understood.

Acknowledgements

Appreciation is extended to the staff and management of Asarco Inc., Norgold Resources Inc., and Bema Gold Inc. for permission to publish this paper. A number of company reports were used and we would collectively thank those who contributed to the project. We would also thank Bill Gay, Steve Keehner, John Malusa, and Jim Rasmussen for their contributions.

References cited

Anderson, P., 1989, Stratigraphic framework, volcanic-plutonic evolution, and vertical deformation of the Proterozoic volcanic belts of Central Arizona, p. 57-147, in Jenny, J. P., and Reynolds, S. J., 1989, Geologic evolution of Arizona: Tucson, Arizona Geological Society Digest Volume XVII, 866 pages.

DeWitt, E., 1989, Geochemistry and tectonic polarity of Early Proterozoic (1700-1750 Ma) plutonic rocks, north-central Arizona, p. 149-163, in Jenny, J. P., and Reynolds, S. J., 1989, Geologic evolution of Arizona: Tucson, Arizona Geological Society Digest Volume XVII, 866 pages.

Goldfarb, R. J., Leach, D. L., Rose, S. C., and Landis, G. P., 1988, Fluid inclusion geochemistry of gold-bearing quartz veins from the Juneau gold belt, southeastern Alaska: Implications for ore genesis: Econ. Geology Monograph 6, pp 363-375.

Honea, R. M., 1990, Various Petrographic Studies - Internal Reports to Asarco.

Malusa, J. J., 1990, Internal Reports to Asarco.

Page, T. C., 1989, Internal Reports to Norgold.

Rasmussen, J. D., 1990, Internal Reports to Asarco.

Robert, F., and Kelly, W. C., 1987, Ore-forming fluids in Archean gold-bearing quartz veins at the Sigma mine, Abitibi greenstone belt, Quebec, Canada: Econ. Geology, v. 82, p. 1464-1482.

Roedder, E., 1984, Fluid inclusions: Reviews in Mineral., v. 12, Mineral. Soc. Amer., 644p.

Shafiqullah, M., Personal Communication, 1990.

Titley, S. R., 1986, An overview of Laramide metallogenesis in Arizona, p. 84-88, in Beatty, B., and Wilkinson, P. A. K., 1986, Frontiers in geology and ore deposits of Arizona and the Southwest: Tucson, Arizona Geological Society Digest Volume XVI, 554 pages.

Table 2. **Yarnell Gold Deposit**

Petrographic Descriptions - Russ Honea

Thin Section Location and Sample No.	Sample Description	Primary Minerals %				Secondary Minerals %				
		Plagio-clase	Micro-cline	Quartz	Biotite	Sericite	Clay	Chlorite	Epidote	Leuco-xene
150	Fresh (Weathered)	25	50	16	7	6	-	1+	3	-
151	Fresh (Weathered)	25	45	18	10	-	3	3	-	-
152	Weak Propylitic	30	44	15	9	9	-	-	2*	<1
162	Weak Propylitic	28	38	20	8	18	-	-	-	1
163	Weak Sericitic	(35)	40	15	(8)	17	-	-	-1	1
164	Weak Sericitic	(32)	43	16	(6)	16	-	-	-	2
165	Sericitic	(44)	29	20	(5)	28	-	-	-	<1
166	Sericitic	(30)	55	10	(3)	8	-	-	-	1
154	Sericitic (Unoxid)	(35)	45	12	(6)	20	4	2	-	1
155	Sericitic (Oxid)	(35)	41	12	(10)	20	-	-	-	1
	Yarnell Fault Zone									
157	Syenite?	(27)	66	3	(2)	2	3	2	-	<1
161	Potassic Rims	(24)	66	5	(2)	7	-	-	-	1
158	Quartz Stockwork	(36)	40	15	(8)	27	-	-	-	1
159	Potassic	(38)	28	25	(7)	35	2	-	-	1***
160	Potassic/* Quartz Veins	(20)	62	12	(5)	10	10	-	1*	<1
167	Sericitic	(39)	32	20	(7)	20	-	-	-	2
168	Sericitic/ Siliceous	(39)	(33)	20	(6)	12	-	-	-	1

(27) - Original mineral now altered to Sericite

*(Clinozoisite)
**Pseudomorphs
***Rutile

Table 2 (cont'd). **Yarnell Gold Deposit**

Petrographic Descriptions - Russ Honea

Thin Section Location and Sample No.	Sample Description	Silica %		Iron Oxides %			
		Quartz/ Adularia	Chalcedony/ Opal	Hematite/ Magnetite	Limonite/ Pyrite(Fresh)	Goethite	Fe Oxide (Undiff.)
150	Fresh (Weathered)	-	-	1/1	-	-	-
151	Fresh (Weathered)	-	-	-	-/<1	-	-
152	Weak Propylitic	-	-	-	-	-	1+
162	Weak Propylitic	4	-	-	-	3+	-
163	Weak Sericitic	3	-	-	-	-	3
164	Weak Sericitic	2	-	-	1+/-	-	1+
165	Sericitic	5	-	<1	-	2	-
166	Sericitic	15 (Veins)	-	2	-	2	-
154	Sericitic (Unoxid)	-	-	1	-/2	-	-
155	Sericitic (Oxid)	-	-	-	-	1**	2
	Yarnell Fault Zone						
157	Syenite?	-	-	-	-	1	2+
161	Potassic Rims	10/15	-	<1	-	-	-
158	Quartz Stockwork	5	-	-	-	2	3+
159	Potassic	15	-	-	-	-	2
160	Potassic/ Quartz Veins	22	<1/<1	-	-	2	4
167	Sericitic	3	-	-	-	3(Hm)	-
168	Sericitic/ Siliceous	4	-	1	1	2	-

**Pseudomorphs

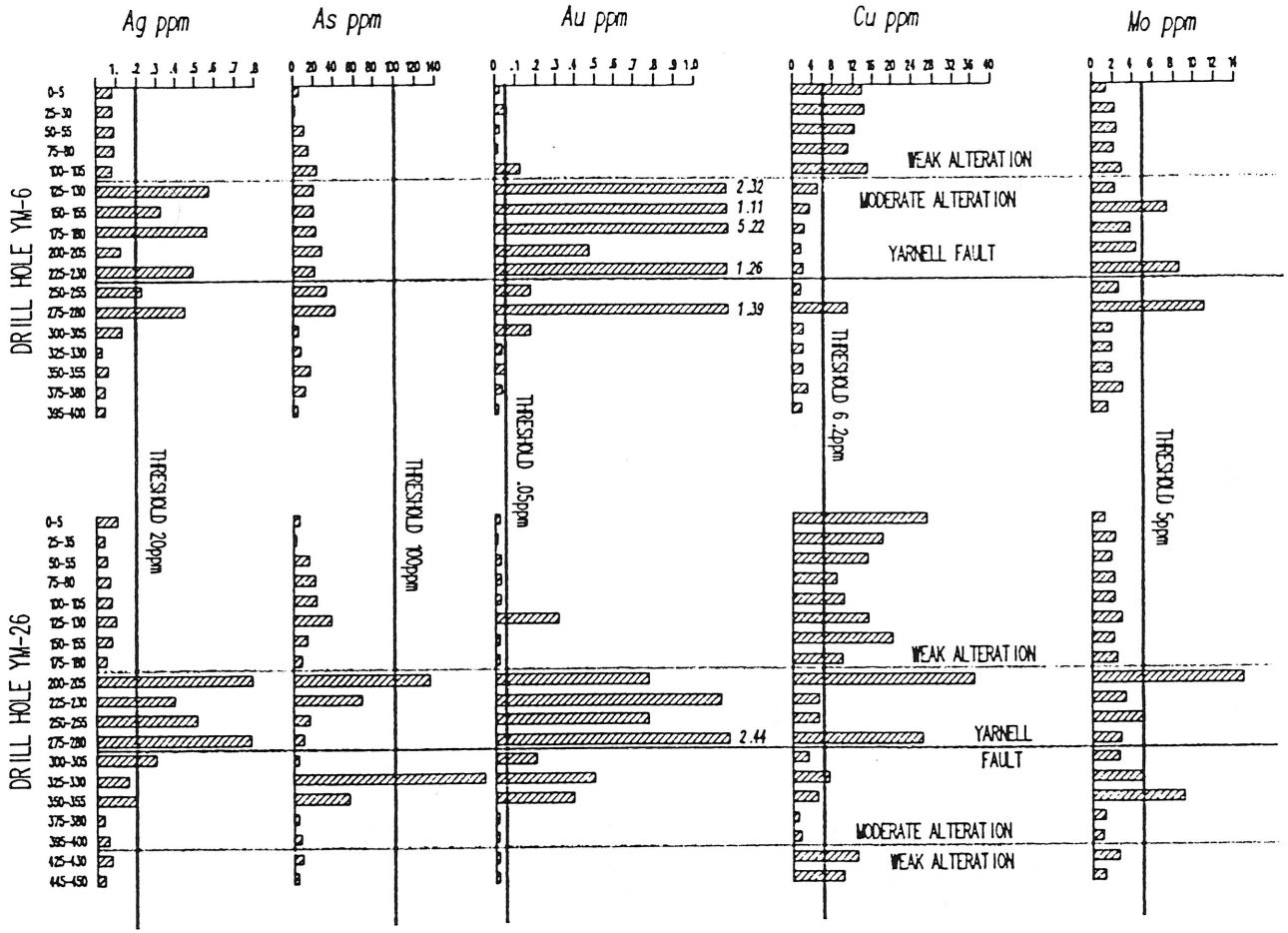


Figure 3. Bar graphs showing concentration of Ag, As, Au, Cu, and Mo found within reverse-circulation drill holes YM - 6 and YM - 26.

YARNELL MINING COMPANY

A SUBSIDIARY OF BEMA GOLD (U.S.) INC.

YARNELL MINING COMPANY PROJECT FACT SHEET

February 1998 *Issue 1, Vol. 1*

What will Yarnell Mining Company do to protect air quality?

All large industrial activities which generate air emissions are regulated by state and federal laws. These laws specify emission limits and require certain emission controls.

Before the Yarnell Mining Company can begin to operate, it must obtain an Air Quality Control Permit from the Arizona Department of Environmental Quality (ADEQ). In its permit application, the Company must present a detailed computerized model which estimates the maximum, total emissions that could be generated by the project. It also outlines how the Company will control and regulate those emissions.

The mine design includes many operational control features to allow Yarnell Mining Company to closely monitor and reduce air emissions. The Company will take precautions to limit particulate matter from becoming airborne during construction, blasting, hauling, crushing and earth moving and handling operations, and emissions caused by diesel equipment and the ore processing facilities. Bema Gold Corporation, Yarnell's parent company, has successfully used this technology at its other mining projects.

Listed below is a summary of the measures that will be taken and the controls incorporated into the design and operation of the Yarnell project.

Air Emission Controls

The Air Quality Control Permit requires that Yarnell Mining Company incorporate numerous controls on the mine facilities and equipment to reduce air emissions. These controls include:

- *The use of water and/or environmentally-safe chemical dust suppressants on roads, open areas, and material handling areas. The application frequency and intensity will be closely monitored and documented.*
- *Equipping the blast hole drill with a combination of water injection, a pneumatic flushing device, and/or a dust shroud.*
- *The use of water sprays on the crushing plant during times it is operating.*
- *The installation and maintenance of a baghouse on the carbon kiln and dore' furnace, which are used in the processing plant as part of the procedure to make dore' bars, the final product.*
- *Maintaining the alkalinity of the sodium cyanide leach solution to reduce fugitive emissions of hydrogen cyanide from the leach pad and processing circuit. Lime will be added to the ore to help maintain the protective alkalinity, and the pH of the leach solution will be checked daily.*
- *The installation and maintenance of a fabric filter on the lime silo to collect the dust emitted during the silo loading process.*
- *The use of drip emitters to apply the process solution to the ore heap to eliminate overspraying and ponding.*

(Continued on Page 2)

- *Burning diesel fuel with a low sulfur content in the generators and heavy equipment.*
- *The proper transport, storage and use solvents or other volatile compounds, such as paints and alkalies so that they will not evaporate, leak or otherwise be emitted into the atmosphere.*

Performance Tests

Yarnell Mining Company will conduct performance tests on the emission control equipment to assure that it is functioning properly. Approved testing methods will be used to check the processing plant baghouse, the crushing plant controls and the generator stacks. Tests will be conducted following initial start-up, and once every two years thereafter. All test results will be reported to ADEQ.

Operations and Maintenance

Yarnell Mining Company will submit a detailed Operation and Maintenance Plan describing the actions and procedures that will be followed to achieve and maintain compliance with the Air Quality Control Permit.

Record Keeping

Yarnell Mining Company will maintain detailed records of all data and support information during operational monitoring.

Need any more information?

The Yarnell Mining Company staff is available to answer your questions. Please feel free to call us at *(520) 427-3353*.

YARNELL MINING COMPANY

A SUBSIDIARY OF BEMA GOLD (U.S.) INC.

YARNELL MINING COMPANY PROJECT FACT SHEET

February 1998 *Issue 1, Vol. 1*

What will Yarnell Mining Company do to protect groundwater and surface water quality?

The Yarnell Heap Leach Facility will be constructed using state-of-the-art mining technology. Bema Gold Corporation, Yarnell Mining Company's parent company, has successfully used this technology at its other mining projects. The Arizona Department of Environmental Quality (ADEQ) regulates industrial impacts to water quality and requires the use of Best Available Demonstrated Control Technology, (known as "BADCT"). BADCT specifies the best known methods of constructing a mining facility for protecting groundwater and surface water. By designing its facility to meet prescriptive specifications outlined in the Arizona Mining BADCT Guidance Manual, Yarnell has demonstrated BADCT.

The facility's design includes control features which allow the Company to closely monitor the facility during construction and operation for any problems. Listed below is a summary of the controls incorporated into its design, construction and operation.

Solution Storage Ponds

- *Two process solution ponds will be constructed to contain the solution used in the heap leach process. Both solution ponds will be double-lined with high density polyethylene (HDPE), and a leak detection system will be installed between the two liners and monitored daily for the presence of moisture. The HDPE liners will be installed on top of a thick, compacted, soil layer containing clay.*

- *A third pond will be constructed to provide additional storage and to collect stormwater if heavy rains occur. This pond will again be lined with HDPE and a leak detection system will be installed.*

- *All of the ponds are designed to handle extreme precipitation conditions. Together, the ponds have sufficient capacity to contain a 100-year, 24-hour storm event involving the entire heap leach facility, in addition to the working volumes and the solution that would drain from the heap during a 24-hour power outage. Since the Company plans to generate power at the site and will have access to a backup power supply, it can pump the solution from the ponds to the heap in the case of a continuing power outage. Also, additional emergency storage will be available.*

Heap Leach Pad

- *One dedicated heap leach pad will be constructed to contain all of the ore mined during the six-year mine life. The heap leach pad will be lined with HDPE on top of a compacted, one-foot thick layer of soil containing clay.*

- *A leak detection system will be constructed within the liner system to enable the Company to monitor for any leakage through the HDPE liner throughout the entire leach pad. Any leakage will drain into a system of pipes, which connects to three sumps along the south side of the heap leach pad. These sumps will be monitored daily.*

- *A protective layer of crushed ore will be placed on the liner before normal placement of ore and equipment is allowed on the pad.*

(Continued on Page 2)

Other Protective Measures

- *Stormwater diversion channels will be constructed to safely convey the peak runoff from the 100-year, 24-hour storm event. These channels will be inspected monthly.*
- *Sediment retention ponds will be built downgradient from both waste rock dump areas to collect surface water runoff and sediment.*
- *A subsurface drain system will be constructed beneath the heap leach pad and solution ponds to collect any shallow groundwater flow (if it occurs) and convey it to a sump for removal.*
- *The HDPE liner will be placed under the entire heap leach facility, including the processing plant.*

What kind of monitoring activities will be conducted to ensure compliance?

Facility Design

- *The entire heap leach facility, including the leach pad, ponds and leak detection sumps will be inspected daily for any signs of leakage or physical damage. All damage and repairs will be documented in a log book.*
- *Mined waste rock (the rock that does not contain gold) will be sampled and analyzed quarterly during operation to ensure that the material will not adversely affect water quality.*

Groundwater and Surface Water Monitoring

- *Yarnell Mining Company has already collected eight quarterly groundwater samples from wells at the site to establish existing water quality data and to provide a baseline for comparison with groundwater quality during and after operation. The Company will continue to monitor groundwater downgradient from the heap leach facility quarterly during operation and following closure to ensure there are no impacts to groundwater from the mining operation.*
- *Yarnell Mining Company will also monitor two natural springs downgradient from the property to establish current conditions and ensure that water quality is not adversely affected. Results from this testing will be reported quarterly.*
- *Monitoring results will be reviewed by ADEQ to ensure compliance with water quality standards. If water quality standards are exceeded, Yarnell Mining Company will follow the requirements of a comprehensive contingency plan to evaluate and rectify any problems.*

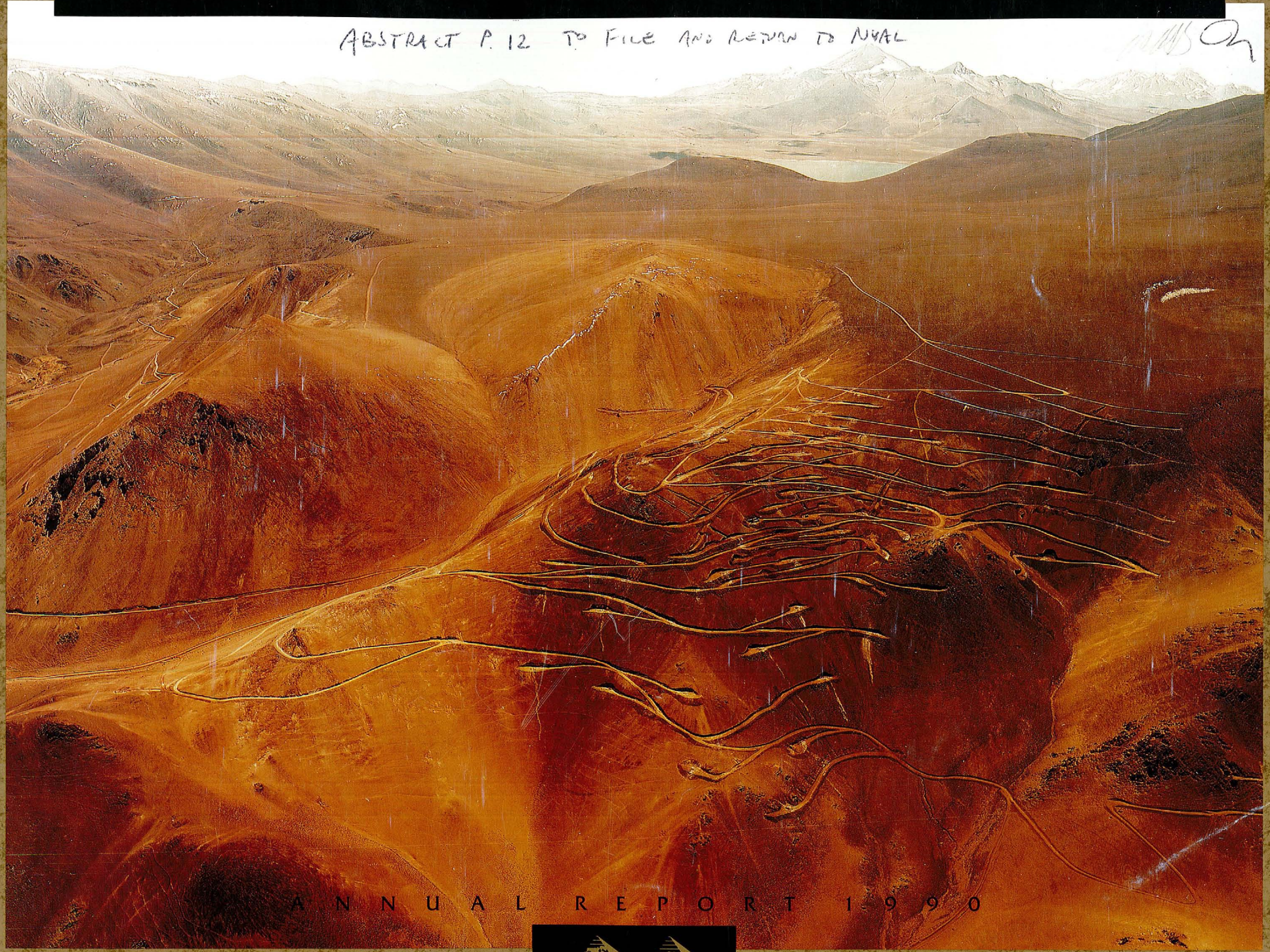
Contingency Plans

- *In the event that the leak detection systems detect leakage in the process solution ponds or leach pad, comprehensive contingency plans have been developed to quantify the problem and take necessary steps to correct the situation. Plans include closure of the affected facility area and installation of additional groundwater monitoring wells if necessary.*
- *If the results of waste rock sampling indicate specific material has the potential to degrade water quality, the Company will separate this material to isolate it from air and direct precipitation and buffer it with inert material.*

(Continued on Page 3)

BEMA GOLD CORPORATION

ABSTRACT P. 12 TO FILE AND RETURN TO NVAL



ANNUAL REPORT 1990

COVER PHOTO:
VIEW OF THE VERDE AND PANCHO DEPOSITS AT THE REFUGIO PROPERTY, CHILE

CONTENTS

PROPERTY LOCATIONS

HIGHLIGHTS 1990

- Positive Feasibility Study on the Verde Deposit at the Refugio Property, Chile, recommends production averaging 233,000 ounces of gold per year for the first 9.4 years, with operating costs averaging U.S. $189 per ounce.

- Further drilling on the Verde and Pancho Deposits increases total reserves at the Refugio Property to 8.6 million ounces of gold.

- Champagne Mine, Idaho, produces a record 26,900 ounces of gold equivalent with average operating costs of U.S. $164 per ounce.

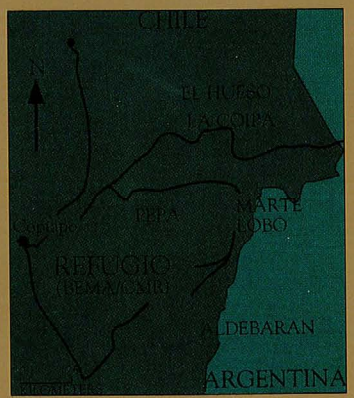
- Final Bureau of Land Management (BLM) and State Production Permits received for the Buffalo Gulch Deposit in Idaho.

- Acquisition of the Yarnell Property, Arizona, by corporate takeover of Norgold Resources, adds approximately 275,000 ounces of gold reserves.

- Since January 1990, the Company raised $16.3 million of equity and debt financing.

PREPARING FOR A GOLD SILVER DORÉ POUR AT THE CHAMPAGNE MINE

The Refugio Property, Chile:



THE REFUGIO PROPERTY IS LOCATED IN A BELT OF WORLD CLASS OREBODIES IN THE MARICUNGA DISTRICT OF NORTHERN CHILE

The Refugio Gold Property is located in the Maricunga District, Northern Chile 700 miles north of Santiago. Access is by good gravel road from the city of Copiapo, 50 miles to the west. Bema Gold's subsidiary, Minera Bema Gold (Chile) Limitada, has the option to earn a 50% interest in the 42 square mile Refugio Property, by funding feasibility work and arranging project financing. The operation will be managed by Bema through Compania Minera Maricunga ("CMM"), the joint venture holding company.

Since commencing exploration in August 1989, Bema Gold has expended $12.2 million on exploration and feasibility work on the property, culminating in the completion of an independent Final Feasibility Study carried out by Mineral Resources Development Inc. on the Verde Deposit on April 15, 1991. Gold reserves at the Verde and Pancho Deposits now total 8.6 million ounces with both deposits remaining open.

Bema's rapid exploration and development programme has confirmed the Verde and Pancho Deposits' status as major new gold deposits in a belt of world class orebodies in the Maricunga District. Along the belt are: the Marte (41 million tons grading 0.044 ounces per ton gold) and Lobo Deposits (70 millions tons grading 0.044 ounces per ton gold) 19 miles to the northwest of Refugio, owned by Anglo American and Cominco Resources; the La Coipa Deposit (78 million tons grading 0.035 ounces per ton gold and 2.5 ounces per ton silver) 38 miles to the north, owned by Placer Dome and TVX; and further to the north, Homestake's El Hueso Deposit (19 million tons grading 0.049 ounces per ton gold).

In addition, Bema Gold's 43% owned public subsidiary, Arizona Star Resource Corp., recently entered into a letter of intent with Anglo American to joint venture the Aldebaran Property, 11 miles south of Refugio. Initial exploration on the Property indicates the potential for large low grade gold deposits. Arizona Star is the operator and has the option to earn a 51 % interest.

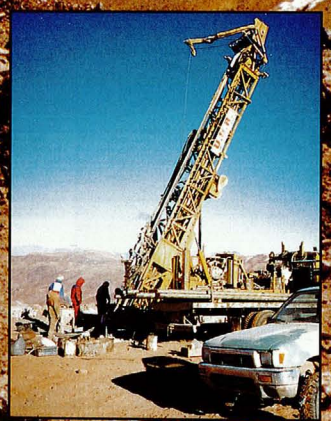
GEOLOGY

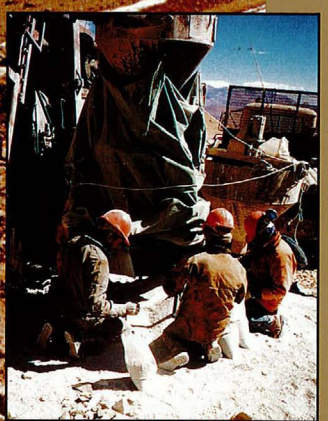
Gold and minor copper mineralization at Refugio occurs in stockworks exposed at surface. The gold bearing stockworks are centred on diorite intrusives and are closely associated with quartz and magnetite.

Geologically, Refugio shows many features that are common to the very large (up to 500+ million tons) gold/copper porphyries of the Southwestern Pacific and the Philippines. Factors particularly indicative are the presence of quartz/magnetite stockworks and the very close similarities in chemistry of the mineralization and alteration systems.

EXPLORATION

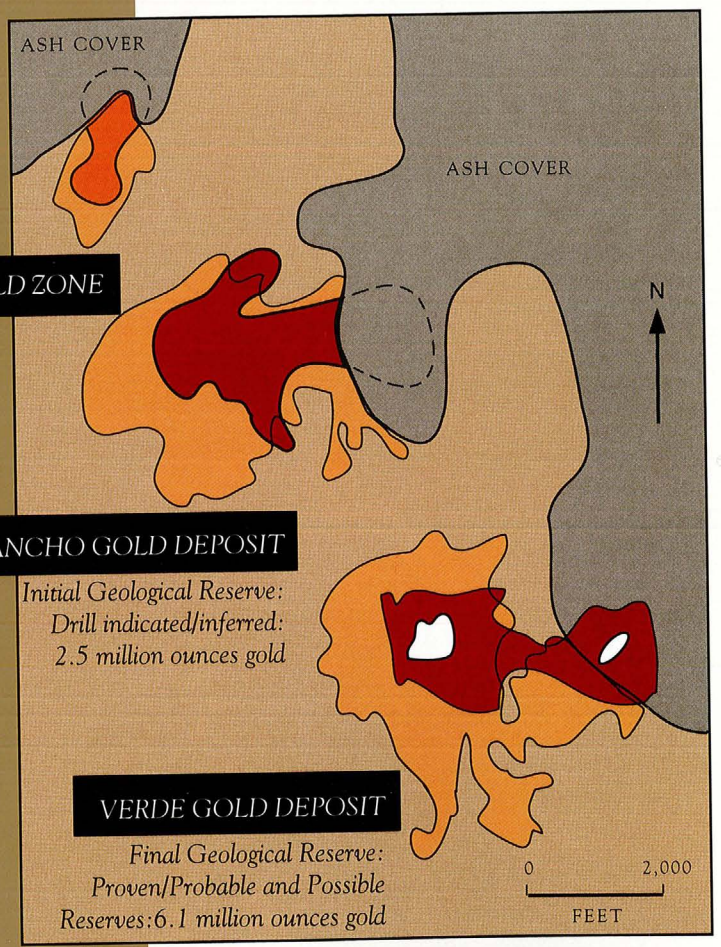
Exploration work at Refugio has concentrated on two main areas of gold mineralized stockworks, the Verde and Pancho Deposits. Surface prospecting has indicated other potential mineralized zones, suggesting the Verde and Pancho Deposits may be two of a series of large disseminated gold deposits. Exploration of other targets on the Property will be carried out in conjunction with the development of the Verde and Pancho Deposits.





FULL PAGE PHOTO:
DRILL ROADS ON
WEST VERDE
INSET PHOTOS:
(LEFT)
GEOLOGISTS
GARY NORDIN AND
ROMAN FLORES
PLAN DRILL
PROGRAMME
AT VERDE
(CENTRE)
REVERSE
CIRCULATION
DRILLING
(RIGHT)
COLLECTING
SAMPLES FROM
THE REVERSE
CIRCULATION DRILL

PLAN MAP



THE VERDE DEPOSIT

The majority of Bema's exploration on the Refugio Property has concentrated on the Verde Deposit. To date, 180,000 feet of reverse circulation drilling and 20,000 feet of diamond drilling has been completed in two phases yielding geological reserves of 238 million tons grading 0.026 ounces per ton gold, containing 6.1 million ounces of gold at a cut-off grade of 0.015 ounces per ton. The reserves, as certified by MRDI, were established by using "kriging" within grade zones.

The Verde deposit has now been defined over 4500 feet in length, up to 2100 feet in width, and in excess of 600 feet in depth. It remains entirely open at depth with no indication of narrowing at the lower levels. Further drilling will be required to determine the ultimate gold reserves contained within the Verde Deposit

PRELIMINARY FEASIBILITY STUDY

In January 1990, MRDI completed a Preliminary Feasibility Study on the Verde Deposit. The Study included geological and metallurgical interpretation of the orebody, conceptual mine planning and engineering studies and the development of capital and operating costs to support the economic analysis of the project.

The Study concluded that the Verde Deposit is both technically and financially viable as a large scale open pit mine, and subject to the findings of a Final Feasibility Study, should be developed to commercial production. The Preliminary Study recommended ore be processed at a rate of 33,000 tons per day (11.9 million tons per year), yielding average annual production of 225,000 ounces of gold, with an initial mine life of 9.4 years. Based on the recommendations made in the Preliminary Feasibility Study, Bema Gold commissioned MRDI to complete a Final Feasibility Study on the Verde Deposit.

FINAL FEASIBILITY STUDY

The Final Feasibility Study on the Verde Deposit was completed on April 15, 1991 and concludes that the Verde Deposit is both technically and economically viable as a large scale, open pit heap leach gold mine. The findings of the Final Feasibility Study demonstrate substantial improvements in the economics and the mine life of the project compared with the results of the Preliminary Feasibility Study completed in January 1991. The improved economics are primarily the result of a higher gold grade in the mineable

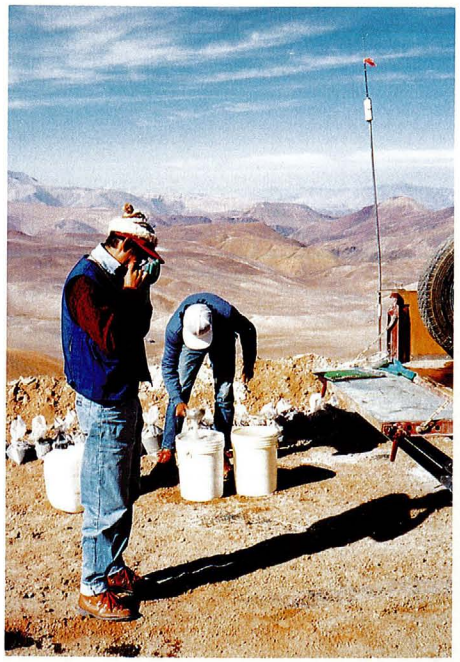
reserves, lower reagent consumptions and mining plan optimization.

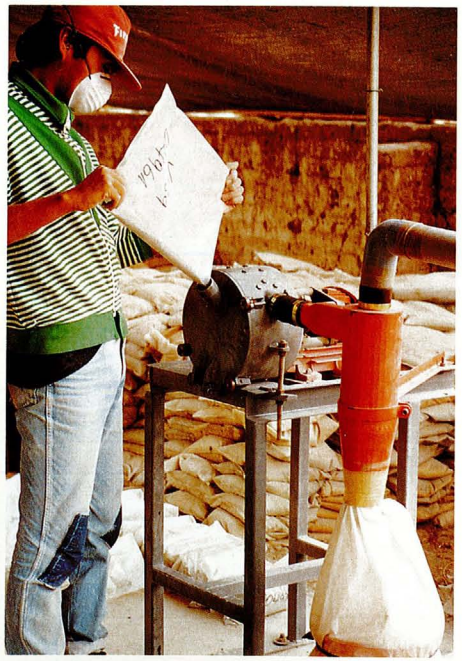
SUMMARY OF RESULTS

The Final Feasibility Study recommends that the Verde Deposit be developed as an open pit heap leach operation. The Study has established a Base Case initial mineable reserve of 112 million tons grading 0.030 ounces per ton gold containing 3.3 million ounces of gold with a strip ratio of 1:1. Additionally, the Study has identified an Extended Base Case reserve that includes the Base Case and totals 204 million tons grading 0.026 ounces per ton gold containing 5.3 million ounces of gold. This extended reserve consists of 79% in the proven/probable category and 21% in the possible category, with a strip ratio of 0.9:1. The possible reserve requires confirmation by further drilling.

BASE CASE SUMMARY

The Study recommends ore be processed at a rate of 33,000 tons per day (11.9





PHOTOS:

(LEFT)

CHIEF GEOLOGIST, ROMAN FLORES EXAMINES DRILL SAMPLES

(CENTRE)

PREPARING DRILL SAMPLES FOR ASSAY

(RIGHT)

COLUMN TESTING OF VERDE ORE ON SITE AT THE REFUGIO PROPERTY

...THE FINAL FEASIBILITY STUDY ON THE VERDE DEPOSIT RECOMMENDS THAT THE DEPOSIT BE DEVELOPED AS A LOW COST, OPEN PIT HEAP LEACHING OPERATION

million tons per year). At this rate the Base Case will produce an average of 233,000 ounces of gold per year at an average operating cost of U.S. $189 per ounce for 9.4 years. Utilizing a constant gold price of U.S. $375, the Base Case generates a real internal rate of return of 33.9% before tax and 26.3% after tax. Cumulative net cashflows are U.S. $240 million pre-tax and U.S. $157 million after tax. Initial fixed capital cost is U.S. $101 million with a payback period of 2.7 years.

The Base Case project sensitivity analyses indicate that, at a constant gold price of U.S. $350 per ounce of gold, the real internal rate of return is 27.3% pre-tax and 21.2% after tax. Using a constant gold price of U.S. $400 per ounce the real internal rate of return is 40.3% pre-tax and 31.2% after tax.

EXTENDED BASE CASE SUMMARY

At 33,000 tons per day, the Extended Base Case will extend the Verde mine life by 7.8 years to a total of 17.2 years. During the first 9.4 years, the operating costs and production levels remain the same as the Base Case. For the total 17.2 year mine life, annual gold production will average 200,000 ounces with average operating costs of U.S. $226 per ounce of gold.

METALLURGY

As part of the Study, extensive metallurgical testwork, carried out in Copiapó and at the Refugio site, has demonstrated that the Deposit, which consists of oxide, mixed and unoxidized ore types, is amenable to heap leaching. Projected average oxide gold recovery is 72% with an overall average gold recovery of 66% for the Base Case and 65% for the Extended Base Case. Column leach testing on site has confirmed that high altitiude has no significant effect upon either leaching rate or ultimate extraction. These tests have also demonstrated a substantial reduction in cyanide consumption at altitude.

DEVELOPMENT AND FINANCING PLAN

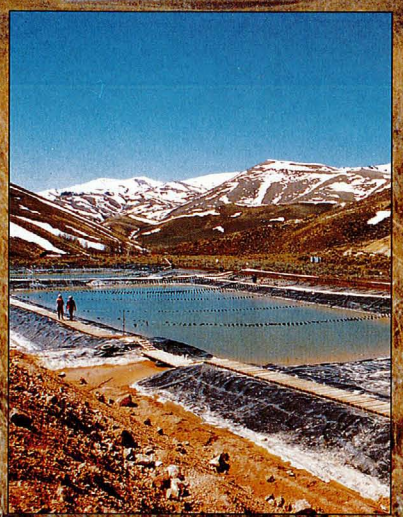
Based on the positive results of the Final Feasibility Study, Bema Gold has decided to proceed with the development of the Verde Deposit to commercial production. The Company has requested bids for engineering, procurement and construction management from several major construction firms, and has commenced negotiations for project financing.

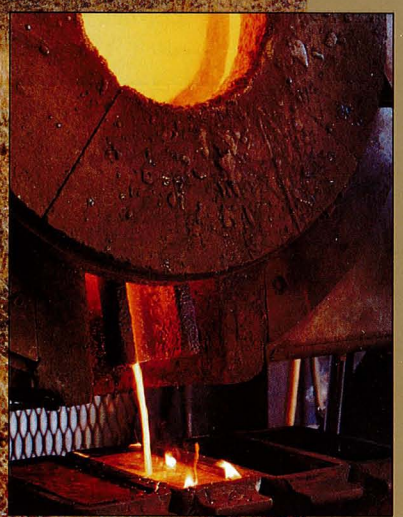
The Company intends to finance the construction of the mine utilizing U.S. $75 million of gold related debt finance, U.S. $20 million of mining equipment lease to purchase, and U.S. $20 million of equity. The equity will be contributed equally by Bema and its joint venture partner.

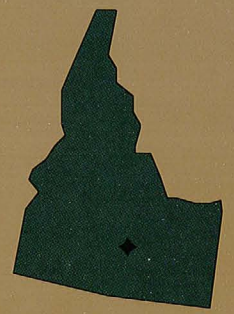
An audit of the Final Feasibility Study is currently being completed by an internationally recognized consulting engineering firm, on behalf of a potential lead bank for the debt finance syndicate. Results of the audit will be released as they are made available to the Company.

Subject to project financing, Bema Gold intends to commence construction at the Verde Deposit in early 1992, with full scale production scheduled for early 1993. Based on this schedule, the Verde Deposit will produce in excess of 250,000 ounces of gold in the first year of production, at an average operating cost of U.S. $148 per ounce.

Champagne Mine, Idaho







IDAHO

PHOTOS

(FULL PAGE)

VIEW OF THE

CHAMPAGNE MINE

(LEFT)

MINING ORE

(CENTRE)

BARREN PONDS

(RIGHT)

POURING DORÉ BARS

Champagne Mine, Idaho

...THE CHAMPAGNE MINE PRODUCED A RECORD 26,900 OUNCES OF GOLD EQUIVALENT IN 1990 WITH AVERAGE OPERATING COSTS OF U.S. $164 PER OUNCE

The Champagne Mine is part of the Lava Creek Property, a 16 square mile mineral property, located 20 miles west of Arco in Butte County, Idaho. The property is owned and operated by Idaho Gold Corporation, an 85% owned subsidiary of Bema Gold Corporation.

Full scale production commenced on schedule at the Champagne Mine on August 1, 1989, just 15 months after the property was acquired. Mine construction was completed on budget at a total cost of U.S. $2 million and advantageous terms were negotiated for a long term lease to purchase for the mining equipment. During 1989, 766,000 tons of ore were mined, yielding 12,400 ounces of gold equivalent at an operating cost of U.S. $168 per ounce.

In 1990, Champagne's first full year of operation, gold equivalent production increased to 26,900 ounces, including 24,700 ounces of gold and 182,000 ounces of silver. The mine operates efficiently with operating costs remaining low at an average for the year of U.S. $3.23 per ton or U.S. $164 per ounce. During the year, a total of 1,421,000 tons of ore and 1,294,000 tons of waste were mined, at an average of 8,000 tons of ore and 7,000 tons of waste per day. 1990 revenue from the Champagne Mine was $11.6 million with gross profits of $6.5 million.

The Champagne orebody is a low grade, oxidized, epithermal gold/silver deposit. It is operated as an open pit mine utilizing a cyanide heap leach recovery process. Ore is blasted and mined at the pit at a rate of approximately 7,600 tons per day. The ratio of waste rock to ore is very low at 0.8:1.0. After blasting, the ore is hauled for a distance of approximately one mile, using a fleet of four 35 ton trucks and is stacked as "run of mine" rock on the leach pads. No crushing or agglomeration is required, thus keeping costs to a minimum. A weak cyanide solution is pumped from the "barren pond" and is "dripped" or "sprinkled" onto the stacked ore. Champagne ore consumes approximately 0.3 pounds of sodium cyanide per ton of ore, considerably less cyanide than is normal for heap leach operations. The cyanide solution complexes with gold and silver contained in the ore and leaves the heap as "pregnant" solution, flowing into the "pregnant pond", from where it is pumped to the Merrill Crowe recovery plant.

Gold and silver are recovered in the plant using a zinc precipitation system and the remaining barren solution is then pumped into the "barren pond". The gold/silver precipitate is retorted in an oven to remove water and mercury and subsequently smelted to produce bars of gold/silver doré, each bar weighing approximately 1,000 ounces and containing 10 - 13% gold and 86 - 89% silver. Life of Mine average mining and milling costs are estimated at U.S. $3.75 per ton, or U.S. $176 per ounce of gold equivalent.

Based on the current shedule, the Champagne Mine is projected to produce 20,000 ounces of gold equivalent in 1991 and 15,000 ounces in 1992. The current reserves will be depleted by the end of 1991, with 1992 production being from secondary leaching. There are a number of additional exploration targets that remain to be tested in the surrounding claim block. If further reserves are not outlined, the Company intends to move the Champagne Mine staff and the mobile equipment to the Yarnell Property in Arizona, in early 1992.

Elk City Gold Belt, Idaho

The Elk City Gold Belt is located in north central Idaho and covers approximately 35 square miles. The properties in the belt are owned and operated by Bema Gold Corporation's subsidiary, Idaho Gold Corporation.

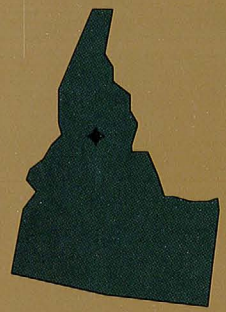
Four gold deposits, Buffalo Gulch, Ericson Reef, Deadwood and Friday, have been outlined within the belt, with two of these, Buffalo Gulch and Ericson Reef, currently scheduled for the commencement of full scale production in late 1991 and 1992 respectively. Total mineable and preliminary mineable oxide reserves for the four deposits in the Elk City Gold Belt are approximately 9.2 million tons at an average grade of 0.025 ounces per ton gold containing 230,000 ounces of oxide gold reserves.

All deposits outlined to date will be developed as open pit, heap leach, gold operations. The Belt will be operated as one mine, the "Elk City Mine", from the town of Elk City, under the supervision of a General Manager, with each deposit being exploited as a separate operating pit of the mine. The mine will have one engineering planning team, single blasting and surveying crews and a central carbon stripping plant together with a central smelting facility.

The reserve at Buffalo Gulch is calculated at 4,839,671 tons at a grade of 0.023 ounces per ton of gold which contains 111,312 ounces of gold. Final BLM and State permits have been received for the Buffalo Gulch Deposit with open pit heap leach gold production scheduled to commence, subject to financing, in late 1991. The Buffalo Gulch Deposit is projected to produce up to 33,000 ounces of gold annually with average operating costs of U.S. $196 per ounce.

Final permitting is currently underway at the Ericson Reef Deposit, where a small oxide and mixed mineable reserve of 450,000 tons at 0.041 ounces per ton gold will be mined in conjunction with the Buffalo Gulch Deposit. Subject to the receipt of BLM and State permits, Ericson Reef is scheduled for open pit heap leach gold production in 1992 with average operating costs of U.S. $139 per ounce.

Results from the initial 11 hole reverse circulation drilling programme at the Wagner exploration zone in the Elk City Gold Belt were disappointing. Additional exploration work is planned for the area in 1991. Substantial areas along the 17 mile Elk City Belt remain untested and hold the potential for additional gold deposits.



IDAHO

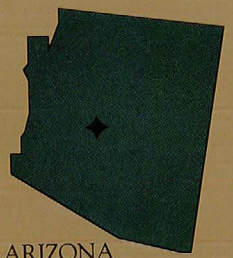
FINAL BUREAU OF LAND MANAGEMENT AND STATE PERMITS WERE RECEIVED FOR THE BUFFALO GULCH DEPOSIT IN THE ELK CITY GOLD BELT...

PHOTO:
TEST HEAP LEACH FACILITIES AT BUFFALO GULCH

FROM: BEMA GOLD CORP.
1990 ANNUAL REPORT

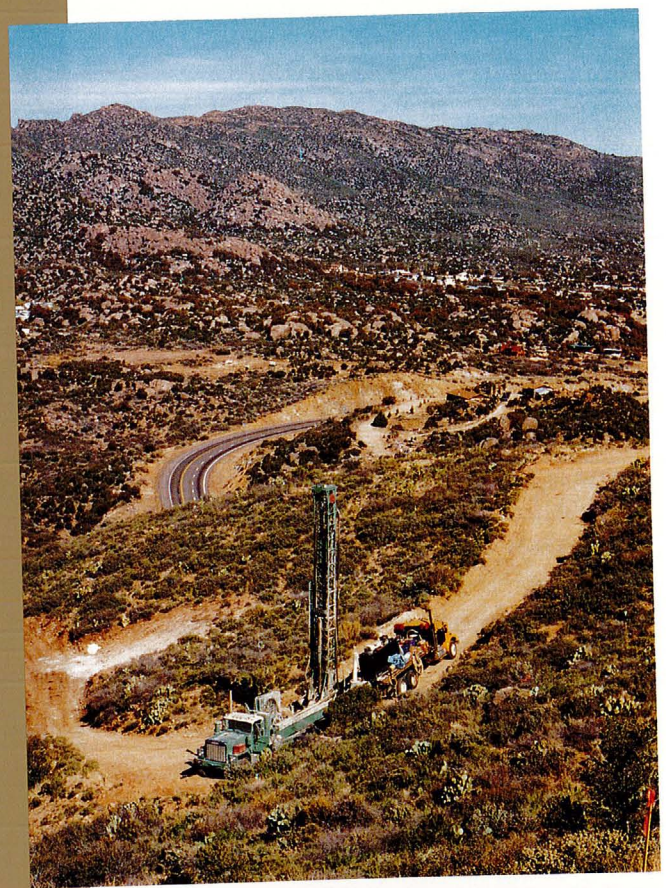
YARNELL (F) YAVAPAI

Yarnell Property, Arizona



ARIZONA

EXPLORATION DRILLING TO DATE ON THE YARNELL PROPERTY HAS OUTLINED AN OXIDE DEPOSIT CONTAINING 273,600 OUNCES OF GOLD RESERVES



Bema's primary target in the successful takeover of Norgold Resources was the Yarnell Property, located in western Yavapai County, Arizona, 65 miles northwest of Phoenix. Exploration drilling to date has outlined an oxide deposit 1,800 feet in length, 500 feet in width with an average thickness of 140 feet, containing 273,600 ounces of gold reserves, with the deposit remaining open. The acquisition of this property at a cash equivalent cost of approximately U.S. $16 per ounce of gold supports Bema's philosophy of increasing its reserves and production through the acquisition of properties with minimal acquisition costs, low debt and the potential for rapid development to full scale production.

An independent geological reserve of 7.6 million tons grading 0.036 ounces per ton gold containing 273,600 ounces of gold has been calculated at a 0.01 ounce per ton gold cut-off grade. Further drilling is planned to test the potential for additional reserves to the southwest and northeast of the deposit. Independent analysis of diamond drilling versus reverse circulation drilling results concludes that the reverse circulation drilling programmes may have significantly understated the grade of the deposit. Metallurgical testwork has demonstrated that the Yarnell ore is amenable to heap leaching with gold recoveries of approximately 71% at a crush size of - 2 inches. Cyanide and lime consumptions are moderate and agglomeration is not required at this crush size.

Bema Gold's operations team has carried out an initial review of the project that suggests the Yarnell Property could be put into production as a low cost, heap leach gold mine at a production rate of approximately 33,000 to 40,000 ounces of gold per year. Bema has initiated permitting and a feasibility study on the property, with production scheduled to commence in 1992. Life of Mine operating costs are estimated at approximately U.S. $ 200 per ounce.

MANAGEMENT'S DISCUSSION AND ANALYSIS

The following discussion of the operating results and financial position of the Company for the three years ended December 31, 1988 to 1990 should be read in conjunction with the Consolidated Financial Statements and related Notes.

OPERATING RESULTS

Revenue for 1990 was $11.6 million versus 1989 revenue of $4.2 million. This increase in revenue is a result of the first full year of production at the Champagne Mine in Idaho, which produced 26,900 ounces of gold equivalent as compared to five months of production in 1989 of 12,400 ounces of gold equivalent. During 1990, the average price received per ounce of gold was U.S. $376, compared to U.S. $377 in 1989; the price received for silver was U.S. $4.62 per ounce in 1990 compared with U.S. $5.16 in 1989. The average annual cash operating costs per ounce of gold equivalent was U.S. $164 in 1990 versus U.S. $168 in 1989. There was no commercial production in 1988.

The net loss for 1990 decreased to $700,000 or $0.03 per share from $2.3 million or $0.11 per share in 1989 and from $1.9 million or $0.11 per share in 1988. This reduction in net loss for 1990 is primarily attibutable to the increase in gross profit from operation at the Champagne Mine to $6.5 million in 1990, compared to $2.4 million in 1989. The increase in gross profit was partially offset by higher depreciation, depletion and amortization expenses, and by increased mining taxes and royalty expenses. The increase in these costs are directly related to increased production at the Champagne Mine. General and administrative costs also increased by $1.5 million in 1990 of which $750,000 was capitalized. The factors contributing to this increase are: one time severance costs for restructuring the management of the Company; the expansion of operations at the Champagne Mine; and the increase in staff from 11 to 20 employees due to increased exploration and development work in the United States and at the Refugio Property in Chile.

In 1990, the basis for the accounting method used in calculating depreciation and depletion was changed from tons of ore mined to ounces of gold equivalent produced. This change was made so that future depreciation charges could be allocated evenly over the production life of the mine. Using the previous basis of tons of ore mined meant that depreciation and depletion would be calculated only until all reserves were depleted. However, in heap leach production, gold recovery can continue for years after reserves are depleted, therefore using ounces of gold equivalent produced is the more appropriate method for Bema Gold in calculating depreciation and depletion as the Company specializes in heap leach production. At Champagne, reserves will be depleted by December 1991, however, the heap leach pads will continue to produce through to February 1993.

By using an accounting method based on ounces of gold equivalent produced, 1990 depreciation, depletion and amortization expenses were reduced by $243,000 and necessitated the restatement of the 1989 loss. The 1989 restatement decreased depreciation, depletion and amortization by $498,000.

REVENUE FOR 1990 WAS $11.6 MILLION VERSUS 1989 REVENUE OF $4.2 MILLION.

Interest expenses in 1990 and 1989 relate primarily to capital lease equipment in use at the Champagne Mine. Approximately 50% of the interest expense on the exchangeable notes and all of the interest expense on the convertible debenture outstanding in 1990 were capitalized to the Refugio Property.

At year end, the book value of the Company's investment in Abo Resource Corp. (Abo) exceeded the market value by $2.9 million, which would, under normal circumstances, necessitate a write-down of the investment. Management has made the decision not to write down this investment in Abo at this time as they believe that there should be an improvement in Abo's share value in 1991, and will re-evalute the investment at the end of 1991. To further build up Abo's oil and gas reserves, Abo intends to participate in the drilling of a number of oil and gas wells in 1991. The first of these has been successfully drilled and Abo is currently awaiting completion of the well.

FINANCING ACTIVITIES

The Company has obtained debt and equity financing for its activities over the last three years: it raised $16.3 million in 1990, $10.8 million in 1989 and $8.1 million in 1988. The funds raised in 1990 were mainly from equity issues for net proceeds of $6.9 million, a debenture for U.S. $1.6 million, a U.S. $3 million gold loan and $5.85 million from exchangeable notes which, subsequent to December 31, 1990, were exchanged into convertible debentures. The debenture for U.S. $1.6 million was issued on January 30, 1990, having a two year term and is convertible into common shares of the Company. Interest on the debenture is payable monthly at a rate of 9% per annum. The $5.85 million convertible debentures are secured by a floating charge against assets, bear interest at a rate of 9% per annum, payable semi-annually, and are convertible into common shares of the Company. The funds raised in 1990 were primarily used for exploration and development at the Refugio Property in Chile, and at the Elk City Gold Belt properties and for general and administrative purposes.

The funds raised in 1989 were from equity issues totalling $6.3 million, $4.0 million by way of capital leases and $1.5 million through a convertible debenture. Funds from financing activities in 1988 were raised primarily through equity issues.

The Company has leased mining and office equipment which has been capitalized for accounting purposes. Lease obligations of $2,612,000 as of December 31, 1990 (December 31, 1989 - $2,996,000) are recorded as liabilities of the Company, the maximum term for any of these leases is 60 months.

In November 1990, Bema's subsidiary, Idaho Gold Corporation, borrowed 7,479 ounces of gold and subsequently sold them at U.S. $401 per ounce through a U.S. $3 million gold loan facility from Sharps Pixley Inc., the bullion trading house through which Bema carries out its gold sales. The loan is repayable in six equal quarterly installments from April 1, 1991 to July 1, 1992.

In November Bema placed forward sales contracts for 8,000 ounces of gold at an average price of U.S. $400 per ounce maturing from July 15, 1991 to March 31, 1992.

CAPITAL EXPENDITURES

Capital expenditures of $11.9 million in 1990 included $8.5 million for exploration and development at the Company's Refugio Property in Chile, which resulted

in a positive Final Feasibility Study for the Verde Deposit. Other capital expenditures were $3.4 million for exploration and development at the Company's U.S. properties, which included $2.5 million at the Elk City Gold Belt. In 1989, $7.8 million was expended in development, construction and purchase of mine equipment for the Champagne Mine, while expenditures for exploration and development at other properties amounted to $4.2 million. Capital expenditures in 1988 of $7.4 million totalled $4.9 million for U.S. resource properties and $2.5 million at the Harrison Gold Property in Canada.

The focus of the Company's capital expenditure programme continues to be exploration and development in the United States and Chile to bring its current gold properties into production. The Company's success in exploration and development to date necessitates the requirement for substantial development funding over the next three years as projects are placed into production. Management is of the view that it should be able to finance the Company's projects to production through a combination of gold loans, equipment leases and equity financings.

ACQUISITION

On March 5, 1991, Bema made a bid to takeover Norgold Resources Inc. ("Norgold"), of Vancouver, B.C., on the basis of one of the Company's shares for each 2.5 Norgold shares. The takeover bid was successful with the Company acquiring a total of 4,872,183 Norgold common shares representing 93.73% of the issued shares. The Company now intends to use the compulsory acquisition provisions of the British Columbia Company Act to acquire the remaining Norgold common shares. Bema will be required to issue approximately 2.2 million common shares in exchange for all of the Norgold shares and rights tendered.

The Company's primary target in this acquisition was Norgold's 100% owned Yarnell property in Arizona, where exploration to date has outlined 273,600 ounces of gold reserves. Bema management believes that Norgold's Yarnell Property could be placed into production as a low cost, open pit heap leach gold mine at the rate of 33,000 to 40,000 ounces of gold per year.

1991 OUTLOOK

The Champagne Mine has established Bema Gold as a low cost, open pit heap leach gold producer. The further acquisition and development of gold reserves in the United States and the positive Verde Deposit Feasibility Study at the Refugio Property gives the potential for a significant increase in annual gold production. Bema Gold's reserves now total 5,000,000 ounces of gold with 3,250,000 ounces in the proven/probable category.

Bema Gold's future success depends upon its ability to continue to finance its operations. Revenue and cash flow will be affected by the price of gold and the extent to which production schedules and targets are achieved.

BEMA GOLD'S RESERVES NOW TOTAL 5,000,000 OUNCES OF GOLD WITH 3,250,000 OUNCES IN THE PROVEN/PROBABLE CATEGORY.

AUDITORS' REPORT

To the Shareholders,
Bema Gold Corporation:

We have audited the consolidated balance sheets of Bema Gold Corporation as at December 31, 1990 and 1989 and the consolidated statements of loss and deficit and changes in financial position for each of the years in the three year period ended December 31, 1990. These financial statements are the responsibility of the company's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards in Canada. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In our opinion, these consolidated financial statements present fairly, in all material respects, the financial position of the company as at December 31, 1990 and 1989 and the results of its operations and the changes in its financial position for each of the years in the three year period ended December 31, 1990 in accordance with generally accepted accounting principles in Canada applied, after giving retroactive effect to the change in the method of calculating depreciation, depletion and amortization as explained in Note 18 to the consolidated financial statements, on a consistent basis.

Deloitte & Touche

Vancouver, Canada
March 8, 1991

CHARTERED ACCOUNTANTS

COMMENTS BY AUDITORS FOR U.S. READERS ON CANADA-UNITED STATES REPORTING CONFLICT

In the United States, reporting standards for auditors would require the expression of an explanatory paragraph (following the opinion paragraph) when the financial statements are affected by significant uncertainties such as those referred to in Note 2.d. to the attached financial statements regarding the company's ability to recover costs of resource properties. Our report to the shareholders dated March 8, 1991 is expressed in accordance with Canadian reporting standards which do not permit a reference to such uncertainties in the Auditors' Report when the uncertainties are adequately disclosed in the financial statements.

Deloitte & Touche

Vancouver, Canada
March 8, 1991

CHARTERED ACCOUNTANTS

CONSOLIDATED BALANCE SHEETS

As at December 31
(Canadian dollars)

ASSETS	1990	1989
Current		
Cash and short-term deposits	$ 5,529,207	$ 78,652
Accounts and note receivable	692,007	1,048,182
Inventories (Note 3)	644,051	336,735
Prepaid expenses	201,022	143,417
	7,066,287	1,606,986
Investments (Note 4)	4,415,099	4,500,797
Property, plant and equipment (Notes 5 and 18)	31,164,248	22,005,434
Other assets (Note 6)	2,297,207	535,171
	$44,942,841	$28,648,388
LIABILITIES		
Current		
Accounts and note payable	$ 2,069,880	$ 1,457,119
Loan payable	–	400,000
Deferred revenue (Note 7)	2,004,185	620,570
Obligations under capital leases due within one year (Note 8)	636,672	713,730
	4,710,737	3,191,419
Deferred revenue (Note 7)	1,739,850	–
Obligations under capital leases (Note 8)	1,974,958	2,282,325
Convertible debentures (Note 10)	1,884,837	1,448,127
Exchangeable notes (Note 11)	5,850,000	–
Provision for reclamation costs	239,549	80,598
Minority interest (Note 18)	210,206	246,473
Other liabilities	151,902	73,970
	16,762,039	7,322,912
SHAREHOLDERS' EQUITY		
Capital stock (Notes 10, 11, 12 and 21)	36,554,773	28,973,299
Authorized - 100,000,000 common shares with no par value		
Issued - 28,090,718 (1989 - 24,107,563) common shares		
Deficit, as restated (Note 18)	(8,373,971)	(7,647,823)
	28,180,802	21,325,476
	$44,942,841	$28,648,388

Approved by the Directors

Director

Director

See accompanying notes to consolidated financial statements

CONSOLIDATED STATEMENTS OF LOSS AND DEFICIT

For the Years Ended December 31
(Canadian dollars)

	1990	1989	1988
Sales of gold and silver	**$ 11,628,794**	$ 4,241,449	$ –
Operating costs	**5,139,457**	1,883,614	–
Gross profit from mine operations	**6,489,337**	2,357,835	–
Expenses			
Depreciation, depletion and amortization	**2,891,115**	1,116,644	6,679
Mining taxes and royalty	**891,522**	230,872	–
Reclamation	**158,951**	82,323	–
General and administrative	**2,633,005**	1,885,018	1,231,459
	6,574,593	3,314,857	1,238,138
Loss before the following	**(85,256)**	(957,022)	(1,238,138)
Interest income	**375,939**	109,936	172,450
Interest on long-term debt	**(488,427)**	(178,296)	–
Amortization of deferred financing costs	**(156,518)**	(77,751)	–
Other losses and write-offs (Note 13)	**(42,084)**	(665,269)	(705,398)
Minority interest	**36,267**	104,008	68,231
Share of losses of investees	**(335,698)**	(621,969)	(209,507)
Loss before income taxes	**(695,777)**	(2,286,363)	(1,912,362)
Current income taxes	**(30,371)**	–	–
Net loss (Note 18)	**(726,148)**	(2,286,363)	(1,912,362)
Deficit, beginning of year	**(7,647,823)**	(5,361,460)	(3,241,558)
Amalgamation costs	–	–	(207,540)
Deficit, end of year	**$(8,373,971)**	$(7,647,823)	$(5,361,460)
Loss per common share	**$ (0.03)**	$ (0.11)	$ (0.11)
Weighted average common shares outstanding	**25,979,103**	21,722,312	16,999,096

See accompanying notes to consolidated financial statements

CONSOLIDATED STATEMENTS OF CHANGES IN FINANCIAL POSITION

For the Years Ended December 31
(Canadian dollars)

	1990	1989	1988
Operating activities			
Cash from (to) operations (Note 14)	$ 2,885,357	$ 143,558	$(1,059,009)
Change in non-cash operating working capital	234,463	283,114	(23,661)
Cash from (to) operating activities	3,119,820	426,672	(1,082,670)
Financing activities			
Shares and warrants issued for:			
Cash, net of commissions and issue costs	6,852,661	5,356,721	3,101,751
Conversion of debenture	728,813	–	–
Resource properties	–	960,000	1,786,875
Investments	–	–	3,378,000
Proceeds from issue of exchangeable notes	5,850,000	–	–
Obligations under capital leases	505,434	3,974,152	–
Payment of obligations under capital leases	(893,170)	(930,185)	–
Proceeds from issue of debenture	1,929,200	1,500,242	–
Debenture repayment and conversion	(1,470,813)	–	–
Deferred revenue proceeds	3,490,500	–	–
Deferred financing costs	(801,138)	(122,344)	–
Other	82,577	25,297	(181,005)
Cash from financing activities	16,274,064	10,763,883	8,085,621
Investing activities			
Expenditures on property, plant and equipment	(11,870,408)	(7,982,566)	(7,370,743)
Purchase of equity investments	(250,000)	(375,000)	(3,858,000)
Proceeds on sale of investments and fixed assets	155,175	428,706	16,090
Acquisition of equipment under capital leases	(505,434)	(3,974,152)	–
Received on sale of Imperial Gold Corporation	–	280,000	–
Long-term receivables	(776,285)	–	–
Reclamation deposits	(396,043)	(239,894)	127,211
Other liabilities	99,666	–	–
Cash to investing activities	(13,543,329)	(11,862,906)	(11,085,442)
Increase (decrease) in cash and cash equivalents	5,850,555	(672,351)	(4,082,491)
Cash and cash equivalents, beginning of year	(321,348)	351,003	4,433,494
Cash and cash equivalents, end of year	$ 5,529,207	$ (321,348)	$ 351,003
Cash and cash equivalents represented by:			
Cash and short-term deposits	$ 5,529,207	$ 78,652	$ 471,003
Bank loan payable	–	(400,000)	(120,000)
	$ 5,529,207	$ (321,348)	$ 351,003

See accompanying notes to consolidated financial statements

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Basis of presentation

The Company received a Certificate of Amalgamation on December 5, 1988 whereby a new entity, Bema Gold Corporation (the "Company"), was formed by the amalgamation of Amir Mines Ltd., Normine Resources Ltd. and Bema International Resources Inc. The figures reflect the combined financial positions of the amalgamated companies and their combined results of operations and changes in financial position for each year. Certain of the prior years' comparative figures have been reclassified to conform with the presentation adopted for 1990.

2. Summary of significant accounting policies

The consolidated financial statements of the Company have been prepared in accordance with accounting principles generally accepted in Canada, which differ in some respects with accounting principles generally accepted in the United States (see Note 19).

a. Principles of consolidation

These consolidated financial statements include the accounts of Bema Gold Corporation and its subsidiaries, Bema Resource Management Ltd. (100%), Bema Gold (U.S.) Inc. (100%), Bema Resource Management (U.S.) Inc. (100%), Idaho Gold Corporation (85%), Minera Bema Gold (Chile) Limitada (100%), and Slumbering Hills Gold Corporation (100%). The results of operations for 1989 and 1988 include the operating results of Imperial Gold Corporation (100%), which were insignificant on a group basis, to the effective date of sale of June 1, 1989. All inter-company transactions have been eliminated.

b. Inventories

Inventory of work-in-process consists of mining costs related to ore on the leach pads and metals being processed. Mining costs in inventory are based on estimated future metal recoveries. These costs are valued at the lower of average cost and net realizable value.

c. Investments

The Company follows the equity method of accounting for its investments in companies in which it owns less than 50% and over which it is able to exercise significant influence. Investments in shares in other companies are carried at cost less writedowns for impairment of value when appropriate.

d. Property, plant and equipment

Property, plant and equipment are recorded at cost. The cost of mineral properties includes direct exploration and development costs as well as interest charges that can be directly related to the cost of exploration and development.

Depreciation and depletion on the Champagne Mine and mining equipment, currently in use at the Champagne mine site, have been provided on the following basis:

i) Mine property, plant and equipment - unit of production method

ii) Mining equipment - straight-line over estimated useful life of 10 years.

Depreciation for other depreciable assets is calculated on the declining balance basis at rates of 20% to 30% which amortizes the cost of the fixed assets over their estimated productive lives.

Some of the Company's properties are in the exploration and development stage and have not yet attained commercial production. The ultimate realization of the value of properties in the exploration and development stage is dependent upon the successful development or sale of these properties.

Costs related to properties abandoned are written-off when it is determined that the property has no continuing value.

e. Revenue recognition

Revenue, net of refining and selling costs, is recorded at the estimated net realizable value when the gold and silver is available to be processed by the smelter or refinery. Adjustments to these amounts are made after final prices, weights and assays are established. The Company may fix the price it will receive for part or all of its production by selling forward on the metal and currency markets.

f. Deferred financing costs

Financing costs including finders' fees incurred on issuance of debt are deferred and charged against earnings over the term of the indebtedness.

g. Reclamation costs

A provision for estimated future reclamation and mine closure costs is provided for, on a unit of production basis, when it is determined that the remaining life of the operation is five years or less. Costs related to ongoing programs are expensed when incurred.

h. Foreign exchange translation

Exchange gains or losses arising on translation are included in income for the year, except for those gains and losses arising from the translation of long-term monetary assets or liabilities which are deferred and amortized over the life of the respective asset or liability. The Company's foreign operations are integrated subsidiaries and translated using the temporal method.

3. Inventories

Inventories consist of:

	1990	1989
Work-in-process	$ 571,367	$ 281,658
Supplies	72,684	55,077
	$ 644,051	$ 336,735

4. Investments

Investments, at equity	1990	1989
Abo Resource Corp. (41% owned - 1990)	$ 3,407,506	$ 3,413,231
Arizona Star Resource Corp. (43% owned - 1990)	846,577	909,780
Victoria Resource Corporation (23% owned - 1990)	161,016	177,786
	$ 4,415,099	$ 4,500,797

5. Property, plant and equipment

Property, plant and equipment consists of:

	1990	1989
Champagne Mine, Idaho		
Property, plant and equipment	$ 6,279,188	$ 6,241,153
Capital lease equipment	4,029,268	3,974,152
	10,308,456	10,215,305
Exploration properties	7,808,516	7,773,119
Development properties	16,528,055	4,976,250
Other capital leases	376,425	–
Other	235,625	169,696
	35,257,077	23,134,370
Less: Accumulated depreciation, depletion and amortization		
Mine property, plant and equipment	(3,487,072)	(936,745)
Capital leases	(555,475)	(150,585)
Other	(50,282)	(41,606)
	(4,092,829)	(1,128,936)
	$31,164,248	$22,005,434

As at December 31, 1990, exploration and development properties include expenditures totalling $2,006,500 (1989 - $1,792,000), the tax deductibility of which has been assigned to flow-through share subscribers.

Also during the current period, long-term debt interest expense of $367,634 (1989 - Nil) has been capitalized to development properties.

6. Other assets

Other assets consist of:

	1990	1989
Term deposits held as reclamation deposits	$ 728,032	$ 331,989
Deferred financing costs, net of amortization	659,240	44,593
Long-term receivable (i)	776,285	–
Share purchase plan loans (ii)	133,650	158,589
	$ 2,297,207	$ 535,171

(i) Represents Value Added Tax, paid to the Chilean government on exploration and development work carried out on the Refugio property, which will be refunded once the property is put into production and gold bullion is exported.

(ii) During 1987 and 1986, the Company provided loans to certain directors and officers for the purchase of shares under share purchase plans. The loans are repayable in annual installments over ten years and, if in default, bear interest at prime plus 1/4%. Current loans receivable of $33,763 as at December 31, 1990 (1989 - $31,680) are included in accounts receivable.

7. Deferred revenue

	1990	1989
U.S. $3 million gold loan facility (i)	$ 3,479,700	$ –
U.S. $500,000 gold line of credit (ii)	264,335	620,570
	3,744,035	620,570
Less: amounts due within one year	2,004,185	620,570
	$ 1,739,850	$ –

(i) During 1990, the Company sold 7,479 ounces of gold at an average price of U.S. $401 per ounce by way of a gold loan facility. Principal payments are to be made in six equal quarterly installments commencing April 1, 1991 and concluding July 1, 1992. Interest payments are also to be made quarterly com-

mencing January 2, 1991. The interest rate may vary with market conditions, with the provision that the interest rate charged be a minimum of 1.75%. The loan is secured by a mortgage against Champagne Mine and a guarantee by the Company.

(ii) At December 31, 1990, the Company has an obligation to repay 550 ounces of gold bullion, borrowed by way of a line of credit and sold at an average price of U.S.$404 per ounce. Principal repayments plus interest at 3.75% are due January 31, 1991 (250 ounces) and March 29, 1991 (300 ounces).

8. Obligations under capital leases

The Company has leased mining and office equipment with effective interest rates ranging from 12% to 16%. These leases, the majority of which are in U.S. dollars, have been capitalized for accounting purposes and lease obligations of $2,611,630 as of December 31, 1990 (December 31, 1989 - $2,996,055) are recorded as liabilities of the Company. The maximum term for any of these leases is 60 months.

The following is a schedule of future minimum lease payments together with the balance of the obligations under the capital leases.

Year ending December 31,	1991	$ 915,872
	1992	865,872
	1993	779,993
	1994	608,844
	1995	93,058
Total minimum lease payments		3,263,639
Less: amount representing interest		652,009
Present value of net minimum lease payments		2,611,630
Due within one year		636,672
		$1,974,958

9. Commitments - resource properties

The Company owns or has options to acquire partial or 100% interests in various properties. For properties in Canada and the United States, including Champagne Mine, minimum advance royalty and option payments for the next five years, are as follows:

1991	$ 686,000
1992	$1,080,000
1993	$ 917,000
1994	$ 459,000
1995	$ 636,000

On September 5, 1989, the Company entered into an agreement to acquire an interest in the Refugio gold property in Chile. Under this agreement, the Company has the right to earn a 50% interest in the property by funding exploration to the completion of the feasibility study. Until completion of the study, the Company's obligation is to fund minimum annual expenditures on the property as follows:

1990	U.S. $1,500,000
1991	U.S. $2,000,000
1992	U.S. $3,500,000
1993	U.S. $5,000,000

The minimum annual expenditures are cumulative and as at December 31, 1990, the Company has made expenditures which satisfy the obligation into 1993.

On completion of a feasibility study, the above expenditure commitments cease. Subject to a positive feasibility study, the Company must arrange financing to place the property into production and will be responsible for 50% of development and construction costs.

10. Convertible debentures

On January 30, 1990, the Company issued a debenture for U.S.$1,625,000 having a two year term and secured by a pledge of its Idaho Gold Corporation shares. Interest on the debenture is payable monthly at a rate of 9% per annum. The debentureholder may convert all or a portion of the debenture into common shares of the Company at Cdn.$3.00 per share during the first year and Cdn.$3.25 per share in the second year, to a maximum of 650,000 shares. The Company has the right in the second year to redeem the debenture or require the debentureholder to convert all or any portion of the debenture into common shares at Cdn.$3.25 per share.

In 1989, the Company issued a convertible debenture for U.S.$1,250,000 with interest payable monthly at a rate of 2% above the U.S. base rate for U.S. dollar loans in Canada. On January 30, 1990, U.S.$625,000 was repaid and on June 29, 1990, the remaining balance of U.S.$625,000 was converted into 583,050 common shares of the Company at Cdn.$1.25 per share.

11. Exchangeable notes

In 1990, the Company issued $5,850,000 of 9% exchangeable notes. The notes will be exchanged into a like principal amount of subordinated convertible debentures of the Company and have a three-year term commencing June 1, 1990. The debentures are secured by a floating charge against assets, will mature May 31, 1993, will bear interest at a rate of 9% per annum, payable semi-annually, and will be convertible into common shares of the Company at $2.85 per share in the first year, $3.25 per share in the second year and $3.75 in the third year. The Company has the right to redeem the debentures upon 90 days notice subject to a redemption charge equal to nine months interest (see Note 12.c.).

12. Capital stock

Changes in common shares for the years ended December 31, 1990, 1989 and 1988 are as follows:

	1990		*1989*		*1988*	
	Shares	*Amount*	*Shares*	*Amount*	*Shares*	*Amount*
Balances at beginning of year	24,107,563	$28,973,299	18,982,618	$ 22,656,578	13,870,800	$14,602,952
Issued during the year						
- for cash or warrants, net of commissions and issue costs	2,653,105	5,786,821	4,302,445	5,337,721	1,638,348	3,101,751
- on conversion of debenture	583,050	728,813	–	–	–	–
- for cash, on exercise of employee and director stock options	747,000	1,065,840	30,000	19,000	–	–
- for property	–	–	792,500	960,000	887,500	1,786,875
- for investment	–	–	–	–	1,000,000	3,200,000
- share exchange agreement	–	–	–	–	1,620,970	–
- own shares held, cancelled on amalgamation	–	–	–	–	(35,000)	(35,000)
Balances at end of year	28,090,718	$36,554,773	24,107,563	$ 28,973,299	18,982,618	$22,656,578

a. On August 17, 1990, the Company issued 1,700,000 shares in exchange for a like number of special warrants. No cash consideration was received as a result of the exchange. The special warrants were issued on January 29, 1990 under a brokered private placement agreement at a price of $2.85 per special warrant.

b. On September 19, 1989, the Company issued 850,000 units comprising one share and one share purchase warrant, at a price of $1.10 per unit for net proceeds of $887,325. The warrants are non-transferable and are for a term of 2 years. Each warrant was exercisable at a price of $1.50 per share until September 18, 1990 and is exercisable at a price of $1.80 per share until September 18, 1991. As at December 31, 1990, 650,000 warrants had been exercised for proceeds of $975,000.

c. A right to acquire 100,000 common shares of the Company at $2.85 per share to May 31, 1991, $3.25 per share to May 31, 1992, and $3.75 per share to May 31, 1993 was granted to an agent in connection with the issue of the exchangeable notes (see Note 11).

d. At December 31, 1990, the Company had granted directors and employees stock options for a total of 2,270,150 shares, of which 241,000 have yet to receive regulatory approval. These options are exercisable at prices ranging from $1.00 to $4.20 per share and expire at varying dates from March 4, 1992 to December 6, 1995 (see Note 21).

13. Other losses and write-offs

	1990	1989	1988
Write-off of resource properties	$ –	$ (190,302)	$ (590,223)
Loss on sale of Imperial Gold Corporation	–	(106,904)	–
Loss on disposal of investments and write down of marketable securities	(42,084)	(368,063)	(115,175)
	$ (42,084)	$ (665,269)	$ (705,398)

14. Cash from (to) operations

Cash provided from (to) operations is as follows:

	1990	1989	1988
Net loss for the year	$ (726,148)	$ (2,286,363)	$(1,912,362)
Non-cash charges (credits)			
Depreciation, depletion and amortization	3,031,418	1,116,644	6,679
Reclamation costs	158,951	82,323	–
Amortization of deferred financing costs	156,518	77,751	–
Share of losses of investees	335,698	621,969	209,507
Other losses and write-offs	42,084	665,269	705,398
Minority interest	(36,267)	(104,008)	(68,231)
Amortization of deferred exchange gain	(76,897)	(30,027)	–
Cash from (to) operations	$ 2,885,357	$ 143,558	$(1,059,009)

15. Related party transactions

During the year, in addition to those disclosed elsewhere in the financial statements, the Company had the following transactions with related parties:

a. Costs incurred with a company with directors in common:	1990	1989	1988
i) Office and general expenses	$ 14,750	$ 135,000	$ 216,613
ii) Evaluation and assessment work on resource properties	$ 18,500	$ 286,106	$ 526,977
iii) General exploration expenses	$ –	$ –	$ 12,825
iv) Management fees	$ 155,750	$ 225,000	$ 198,000
v) Purchase of management contracts and office furniture	$ 172,490	$ –	$ –
b. Management fees received from companies with directors in common	$ 80,000	$ –	$ –
c. Purchase and exchange of shares of a company with directors in common	$ 250,000	$ 375,000	$ –
d. Proceeds on sale of a subsidiary to a company with directors in common	$ –	$ 980,000	$ –
e. Accounts receivable from companies with directors in common	$ 88,641	$ 10,416	$ 28,617
f. Loans receivable from companies with directors in common	$ –	$ 54,544	$ –
g. Note receivable from a company with directors in common, with respect to the sale of a subsidiary	$ –	$ 250,000	$ –
h. Accounts payable to companies with directors in common	$ 7,000	$ 115,510	$ 50,008
i. Loans payable to companies with directors in common	$ –	$ 111,178	$ –

16. Forward contracts

At December 31, 1990 the Company has hedged future production by placing forward sales contracts for 8,000 ounces of gold at an average price of U.S. $400 per ounce, having maturity dates ranging from July 15, 1991 to March 31, 1992.

17. Income taxes

Loss carry-forwards for U.S. income tax purposes of approximately $6.0 million commence to expire in the year 2000 through to 2004 unless utilized (2000 - $302,000; 2001 - $494,000; 2002 - $727,000). For Canadian income tax purposes, non-capital losses of approximately $2.1 million commence to expire in 1992 through to 1996 unless utilized (1992 - $113,000; 1993 - $247,000; 1994 - $963,000). There are also net capital losses from prior years of $264,000 for Canadian income tax purposes that may be applied against future capital gains. No benefit in respect of the losses being carried forward has been recorded in the accounts.

18. Change in accounting policy

The method used in the calculation of depreciation, depletion and amortization has been changed to ounces of gold equivalent recovered from tons of ore mined. This change has been made so that future depreciation charges will more closely match mining revenues. The mining of ore is expected to be completed in 1991, while the leaching and recovery of the dore from the pads is expected to continue well into 1992. Under the previous depreciation method, no depreciation, depletion and amortization would have been charged against 1992 revenues. The effects of this retroactive restatement on the financial statements of the Company are as follows:

	1990	*1989*
Net loss		
Before change in policy	$ (932,676)	$(2,709,968)
Reduction in depreciation, depletion and amortization expense	242,974	498,359
Increase in minority interest	(36,446)	(74,754)
After change in policy	$ (726,148)	$(2,286,363)
Property, plant and equipment		
Before change in policy	$30,422,915	$21,507,075
Reduction to accumulated depreciation, depletion and amortization	741,333	498,359
After change in policy	$31,164,248	$22,005,434
Minority interest		
Before change in policy	$ 99,006	$ 171,719
Increase in minority interest	111,200	74,754
After change in policy	$ 210,206	$ 246,473
Deficit - end of period		
Before change in policy	$ (9,004,104)	$ (8,071,428)
Reduction in depreciation, depletion and amortization expense	741,333	498,359
Increase in minority interest	(111,200)	(74,754)
After change in policy	$ (8,373,971)	$ (7,647,823)

The restatement did not affect years prior to 1989 as the Champagne Mine, which commenced production in August of 1989, is the first property to be put into commercial production by the Company.

19. Differences between Canadian and U.S. generally accepted accounting principles

a. The consolidated financial statements of the Company have been prepared according to Canadian generally accepted accounting principles (GAAP) which differ in some respects to U.S. GAAP. The material differences between Canadian and U.S. GAAP, and their effect on the Company's financial statements are summarized below:

	1990	*1989*	*1988*
Net Loss			
Canadian GAAP	$ (726,148)	$(2,286,363)	$(1,912,362)
Increase in depletion expense (i)	(967,402)	(558,854)	–
Increase in other gains (losses) and (write-offs) (i) (ii)	(286,695)	(1,341,533)	(3,251,922)
Net foreign exchange gain (loss) (iii) (iv)	(14,666)	73,256	–
Amalgamation costs	–	–	(207,540)
Restatement of depreciation, depletion and amortization expense (vi)	498,359	(498,359)	–
Restatement of minority interest (vi)	(74,754)	74,754	–
United States GAAP	$(1,571,306)	$(4,537,099)	$(5,371,824)
Loss per common share - United States GAAP	$ (0.06)	$ (0.21)	$ (0.32)
Loss per common share prior to restatement - United States GAAP	$ (0.08)		

	1990	1989
Assets		
Accounts and note receivable		
Canadian GAAP	$ 692,007	$ 1,048,182
Transfer of share purchase plan loans to shareholders' equity	(33,763)	(31,680)
United States GAAP	$ 658,244	$ 1,016,502
Investments		
Canadian GAAP	$ 4,415,099	$ 4,500,797
Write down to market value (ii)	(3,573,369)	(3,286,674)
United States GAAP	$ 841,730	$ 1,214,123
Property, plant and equipment		
Canadian GAAP	$ 31,164,248	$ 22,005,434
Mining property acquisition costs (i) (iii) (vi)	9,927,515	10,329,527
United States GAAP	$ 41,091,763	$ 32,334,961
Other assets		
Canadian GAAP	$ 2,297,207	$ 535,171
Transfer of share purchase plan loans to shareholders' equity	(133,650)	(158,589)
United States GAAP	$ 2,163,557	$ 376,582
Liabilities		
Other liabilities		
Canadian GAAP	$ 151,902	$ 73,970
Decrease to deferred exchange (iv)	(52,237)	(73,970)
United States GAAP	$ 99,665	–
Minority interest		
Canadian GAAP	$ 210,206	$ 246,473
Restatement adjustment (vi)	–	(74,754)
United States GAAP	$ 210,206	$ 171,719

	1990	1989
Shareholders' Equity		
Capital stock		
Canadian GAAP	$ 36,554,773	$ 28,973,299
Increase in value of shares issued (i)	13,472,939	13,472,939
United States GAAP	$ 50,027,712	$ 42,446,238
Share purchase plan loans		
Canadian GAAP	$ –	$ –
Share purchase plan loans	(167,413)	(190,269)
United States GAAP	$ (167,413)	$ (190,269)
Cumulative translation adjustment		
Canadian GAAP	$ –	$ –
Equity adjustment from foreign currency translation (iii)	(718,740)	(778,704)
United States GAAP	$ (718,740)	$ (778,704)
Deficit		
Canadian GAAP	$ (8,373,971)	$ (7,647,823)
Increase in depletion expense (i)	(1,526,256)	(558,854)
Increase in other gains (losses) and (write-offs) (i) (ii)	(4,880,150)	(4,593,455)
Decrease in general and administrative expense (iii) (iv)	58,590	73,256
Restatement adjustment (vi)	–	(423,605)
United States GAAP	$(14,721,787)	$(13,150,481)

i) **Purchase method**

U.S. GAAP requires the amalgamation of companies to be accounted for under the purchase method if one of the amalgamating companies owns 10% or more of the total outstanding voting common stock of any of the combining enterprises, whereas Canadian GAAP allows the pooling of interests method to be used. Under the purchase method, the market value of the amalgamated company's shares exchanged to acquire the assets is used to determine the value of the assets purchased. These assets are then recorded at fair market value, offset by an increase to the capital stock of the new Company.

ii) **Long-term investments**

U.S. GAAP requires that the market value of common shares of long-term investments, equity accounted for, be disclosed in a note, whereas Canadian GAAP does not. The market value of the Company's investments are:

	1990	*1989*
Abo Resource Corp.	$ 434,000	$ 713,000
Arizona Star Resource Corp.	2,036,394	709,175
Victoria Resource Corp.	129,825	199,065
	$2,600,219	$1,621,240

Furthermore, under U.S. GAAP, the long-term investments accounted for under the equity method would be recorded at the lower of cost and market.

It is management's belief that the market value of Abo shares does not fairly represent the future realizable value of its Harrison Lake and oil and gas properties. Due to other commitments Abo has not had an opportunity to actively pursue further exploration of these properties.

The combined balance sheets and statements of loss and deficit of the Company's long-term investments are presented below:

Condensed Combined Balance Sheets
As at December 31

	1990	*1989*
Assets		
Current assets	$ 627,879	$ 660,766
Investments, loans and other assets	154,984	154,984
Property, plant and equipment	3,368,382	2,955,359
	$ 4,151,245	$ 3,771,109
Liabilities and Shareholders' Equity		
Current liabilities	$ 108,088	$ 358,966
Shareholders' equity	4,043,157	3,412,143
	$ 4,151,245	$ 3,771,109

Condensed Combined Statements of Loss and Deficit
For the Years Ended December 31

	1990	*1989*	*1988*
Revenue	$ 317,357	$ 279,426	$ 189,703
Operating expense	291,760	270,175	217,371
Operating profit (loss)	25,597	9,251	(27,668)
General and administrative expense	(263,097)	(313,011)	(416,219)
Interest and other income	71,489	75,404	79,693
Other losses and write-offs	(3,143)	(732,360)	(1,090,279)
Loss for the period	(169,154)	(960,716)	(1,454,473)
Deficit,beginning of period	(3,270,734)	(2,310,018)	(855,545)
Deficit, end of period	$(3,439,888)	$(3,270,734)	$(2,310,018)

iii) **Foreign currency translation**

U.S. GAAP requires that all components other than common stock and retained earnings (deficit) of the balance sheet prepared in foreign currencies be translated using current exchange rates. Any resulting currency translation adjustments must be accumulated separately within shareholders' equity. Under Canadian GAAP foreign operations classified as "integrated", such as Idaho Gold Corporation, are translated using the temporal method which requires exchange fluctuations to be reflected in the earnings statement.

iv) **Exchange on long-term monetary items**

U.S. GAAP requires unrealized exchange gains or losses on long-term monetary items with fixed or ascertainable lives to be included in income as they arise, while under Canadian GAAP such items are deferred and amortized over the remaining life of the related item.

v) **Segmented information**

U.S. GAAP requires that if 10 percent or more of revenues is derived from a single customer, the revenue from each such customer should be disclosed. All revenues for 1990 and 1989 are derived from one such customer, Sharps Pixley Incorporated, which the Company is not dependent on, as markets for the sale of gold and silver are readily available. Under Canadian GAAP, disclosure is governed by a company's economic dependence on a customer.

vi) **Change in accounting policy**

U.S. GAAP requires that the cumulative effect of changes in accounting policies for prior periods be reflected in the current period as a separate item in the profit and loss statement. Canadian GAAP requires that financial statements be restated to reflect the effect of the change to prior periods (see Note 18).

b. Under U.S. GAAP, the consolidated statement of changes in financial position is called the consolidated statement of cash flows and reflects only cash transactions affecting financing and investing activities, whereas Canadian GAAP requires non-cash activities to be included in the statement. Under U.S. GAAP, the following transactions would be excluded from the consolidated statement of cash flows:

	1990	*1989*	*1988*
Increase (decrease) to cash			
Investing activities			
Property, plant and equipment	$ –	$(960,000)	$(1,786,875)
Investment additions	–	–	(3,200,000)
Financing activities			
Share capital issued	–	960,000	4,986,875

20. Segmented information

The Company operates in one industry and three geographical locations. Financial information by geographical location is as follows:

	1990	*1989*	*1988*
Revenue for the year			
United States	$11,628,794	$ 4,241,449	$ –
Canada	–	–	–
Chile	–	–	–
	$11,628,794	$ 4,241,449	$ –
Net profit (loss) for the year			
United States	$ 1,409,777	$ 531,575	$ (163,298)
Canada	(2,135,925)	(2,817,938)	(1,749,064)
Chile	–	–	–
	$ (726,148)	$(2,286,363)	$(1,912,362)
Identifiable assets at end of year			
United States	$21,837,096	$ 16,491,524	
Canada	12,516,235	11,158,736	
Chile	10,589,510	998,128	
	$44,942,841	$ 28,648,388	

21. Subsequent events

Subsequent to December 31, 1990,

a. the Company issued 30,000 shares under directors' and employees' stock option agreements for total proceeds of $51,000 (see Note 12.d.);

b. the Company granted stock options, subject to regulatory approval, for 141,500 shares exercisable at $3.15 per share and expiring on January 9, 1996;

c. the Company has made an offer to purchase all of the common stock of Norgold Resources Inc. ("Norgold") on the basis of 0.40 common shares of the Company for each common share of Norgold. The offer and withdrawal rights under the offer will expire March 26, 1991, unless extended. Certain principal shareholders of Norgold, holding approximately 37% of the outstanding common shares of Norgold have agreed to tender, and not withdraw, their shares under the offer.

CORPORATE DIRECTORY

OFFICERS

CLIVE T. JOHNSON
CHAIRMAN AND CHIEF EXECUTIVE OFFICER

BARRY D. RAYMENT, PH.D.
PRESIDENT AND CHIEF OPERATING OFFICER

ROGER RICHER
VICE PRESIDENT ADMINISTRATION AND
CORPORATE SECRETARY & COUNSEL

DIRECTORS

RICHARD J. BARCLAY

MICHAEL J. BELEY

ERWIN HAAS

CLIVE T. JOHNSON*

IAN D. JOHNSON

GARY D. NORDIN

BARRY D. RAYMENT*

ANTHONY J. WILLIAMS

NEIL WOODYER*

* EXECUTIVE COMMITTEE

HEAD OFFICE

BOX 48, 1400-510 BURRARD STREET

VANCOUVER, BRITISH COLUMBIA

CANADA V6C 3A8

TEL: (604) 681-8371

FAX: (604) 681-6209

SOLICITORS

SMITH, LYONS, TORRANCE,
STEVENSON & MAYER
550 -999 CANADA PLACE
VANCOUVER, BRITISH COLUMBIA
CANADA V6C 3C8

AUDITORS

DELOITTE & TOUCHE
2000 - 1050 DUNSMUIR STREET
VANCOUVER, BRITISH COLUMBIA
CANADA V7X 1P4

TRANSFER AGENT

CENTRAL GUARANTY TRUST COMPANY
4TH FLOOR, 800 WEST PENDER STREET
VANCOUVER, BRITISH COLUMBIA
CANADA V6C 2V7

TRADING

TRADING
TORONTO STOCK EXCHANGE
VANCOUVER STOCK EXCHANGE
SYMBOL: BGO