

(8th DRAFT PROPOSAL 12/19/02)

The Massoud Memorial Mining Institute
Afghanistan

A proposal for establishing an NGO in Afghanistan for the exploitation of the country's substantial gem deposits, increase miners' income, employment and government revenue in one of the poorest countries in the world by raising current production to between \$300 and \$400 million per year.

Sponsored by
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Appendix 1: 2003 Expedition team members

Afghanistan is one of the richest countries in the world for gem deposits and a wide range other minerals, including copper, lead, iron, rare earth deposits, and precious metals such as gold and silver.

Its tragic history since the Russian invasion in 1979 has prevented these resources from being exploited – except for some gem deposits, which have been mined on a very small and inefficient scale. However, gemstone mining has brought striking increases in the standard of living in parts of Afghanistan, chiefly in the Panjsher valley to the northeast of the capital Kabul and at Jegdalek, to its Southeast.

Our strategy is to jump-start the development of the entire mineral resources sector by radically improving the exploitation of known gemstone deposits and to increase the number of known deposits through exploration.

Afghan gems are principally aquamarines, emeralds, kunzite, lapis lazuli, rubies, spinels (balas rubies), and tourmaline. As regards discovery, these minerals are easily identifiable in stream sediment samples and can be used to identify the location of new deposits by tracking the minerals back to their source. But gemstones occur in specific rock types that are identifiable from satellites. The very latest advances in satellite imaging mean that it is now possible to locate rocks where new deposits should be present, in areas that have not previously been explored or are difficult to reach.

Gem mining and production, as a means of expanding Afghanistan's mineral industry, is a natural place to start because of the small amount of capital required. For \$250,000 a formal program can be developed which will create production of several million dollars every year.

These funds will be used to a) identify the extent and geologic environment of the known gemstone deposits and b) instruct the local miners how to improve their mining techniques, including the use of explosives, how to prospect for new deposits, and how to market their gemstones.

The first phase will be a comprehensive survey which will geologically map the known deposits, expand the known producing areas through geochemical prospecting, and identify new areas using the latest multi-band satellite data and GIS mapping techniques.

Based on surveys undertaken by Geo Vision in 1988-2001 we believe that the gemstone sector's output could be increased to \$50 million per year over a five-year period. This would provide employment for 20,000 people, dramatically increase tax revenues and increase the flow of foreign exchange to a country whose current tax base is only \$86 million.

2 Geo Vision's previous involvement with Afghan gem mining

The proposed NGO is to be a not-for-profit organisation. It is proposed by Gary W. Bowersox who is regarded as the world's leading authority on Afghan gem deposits. His book *Gemstones of Afghanistan*¹ is the standard work on the subject. Its publication preserved the co-ordinates of all known Afghan mineral deposits; the government records of which were destroyed in the Hisbi-Islami shelling of the Ministry of Mines in 1995.

Mr. Bowersox is the owner of GeoVision Inc., a US gem importer and wholesaler specialising in Afghan gems. He served in the US Army in Vietnam from 1966-1969 with the rank of Major and was recently retained as an adviser by the US State Department during the planning of the Afghan war of 2001.

Mr. Bowersox has spent several months every year in Afghanistan since 1972. On these trips he forged friendships with all the major local leaders, miners and mujahedin commanders of the Badakhshan, Panjsher, Jegdalek and Nuristan Districts, men who are crucial to the success of the proposed NGO. Many of these people are now ministers and leaders in the current Afghan government.

In 1976 Mr. Bowersox was appointed the exclusive United States importer for the Afghan production of lapis lazuli. In 1994, he was appointed by the Rabbani-Massoud Government as the official consultant to the Ministry of Mines. The Russian invasion in 1979 and the Taliban civil war in 1995 curtailed these appointments.

Bowersox's career was the subject of a television documentary *The Gem Hunter in Afghanistan* and his autobiography *The Gem Hunter* scheduled to be published in 2003².

He writes:

"I have visited Afghanistan every year since 1972. My organization, Geo Vision, Inc. has provided training to improve the quality and quantity of the gem production by funding eight symposia (conferences on gems and mining addressed by both Afghan and foreign experts) and eight prospecting expeditions.

The projects discussed in this proposal are similar to the ones discussed with the UNDP in 1981 at the time the first symposium. This symposium was proposed, approved and financed by V. Prokofiev, the UNDP representative in Kabul and Gary Bowersox, President, Gem Industries, Inc. Ahmed Shah Massoud in 1987 approved the same program in Takhar, Afghanistan after discussions with me. Massoud was initially interested in developing the gem industry in Afghanistan in order to supply funds for the war and create employment for his people. During an interview for the film The Gem Hunter in Afghanistan at his headquarters and just three weeks before his assassination Massoud said that gems and minerals were the means to a bright future for Afghanistan.

I believe now is the time for this finally to happen." GWB

¹ Bowersox and Chamberlin, *Gemstones of Afghanistan*, 1995, Geoscience Press

² Bowersox, *The Gem Hunter*, Robert Laffont, publication scheduled for late 2003

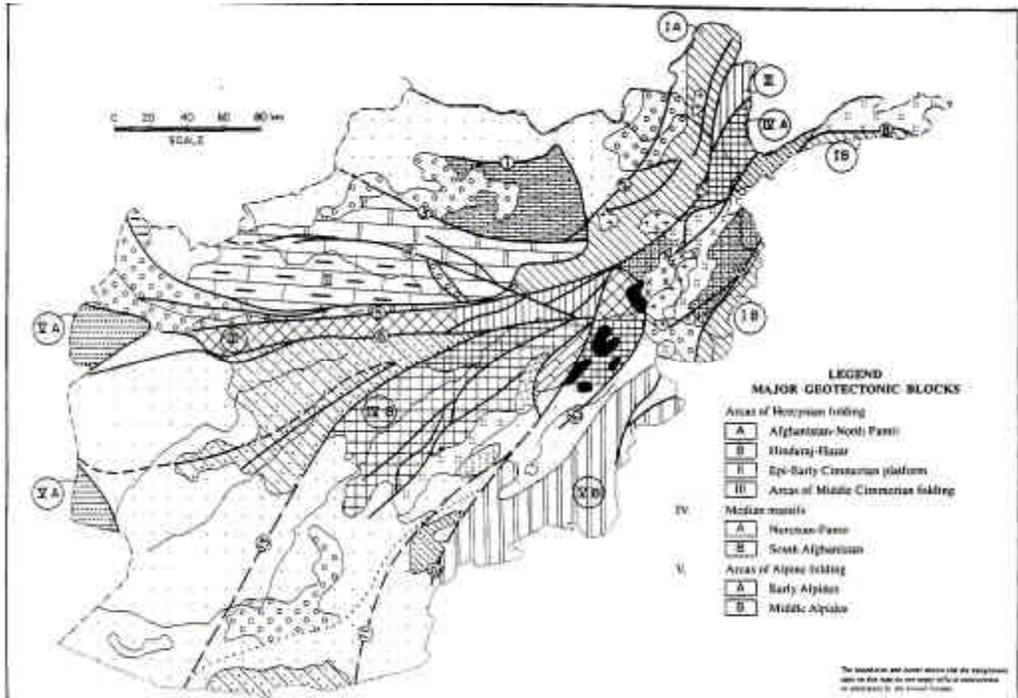
3 Geo Vision's previous expeditions in Afghanistan

GeoVision, Inc. expeditions led by Mr. Bowersox collected data on the deposits shown below, in many cases locating and mapping them for the first time.

Geo Vision's previous expeditions in Afghanistan



Map 1: Gem Deposits in Eastern Afghanistan mapped or located on GeoVision expeditions 1989 – 2001. © 2003 GeoVision, Inc.



The tectonic mosaic of Afghanistan. Bold lines are bounding faults between crustal blocks (after Geology and Mineral Resources of Afghanistan, 1995).

The outcome of these expeditions has been published in substantial articles in the gemological journal of record, *Gems and Gemology* listed below:

[A Status Report On Gemstones From Afghanistan](#) by Gary W. Bowersox © 1985
Gems & Gemology (Winter).

[The Gujjar Killi Emerald Deposit, Northwest Frontier Province, Pakistan](#) by Gary W. Bowersox and Jawaid Anwar© 1989 Gems & Gemology (Spring).

[Emeralds of Panjshir Valley, Afghanistan](#) by Gary W. Bowersox, Lawrence W. Snee, Eugene E. Foord, and Robert R. Seal II© 1991 Gems & Gemology (Spring).

[Ruby and Sapphire from Jegdalek, Afghanistan](#) by Gary W. Bowersox, Eugene E. Foord, Brendan M. Laurs, James E. Shigley, and Christopher P. Smith© 2000 Gems & Gemology (Summer).

In June 1998, Mr. Bowersox was to have led a team of ten Afghans and Americans on an expedition through Badakhshan, Panjsher, Nuristan and Jegdalek, but politics and war curtailed most of this mission. The Americans were all highly-qualified mineralogists, and included Dr. Lawrence Snee, US Geological Survey, and Mr. Derrold Holcomb whose technical advances in gem prospecting by satellite imaging will be included in the proposed projected 2003 Expedition.

4 Currently known gem deposits in Afghanistan

Currently, the total area of known gem deposits is approximately 150 square miles³, double the area known in 1985.

The Afghan gem and mineral deposits are located at one of the most geologically dynamic places in the world, the junction of the Indo-Pakistan and Asian crustal plates, the collision of which gave rise to the

³ Bowersox, *Gemstones of Afghanistan*, p. [check]

Himalayas. According to geologists, the Afghan mountains (the Hindu Kush) are the western end of a succession of important gem-producing regions that stretch along the Himalayas through Pakistan, India and Burma.

The deposits are as follows:

i) Emerald deposits in the Panjsher Valley

The Panjsher emeralds have been mined since approximately 1985. There are no known actively producing emerald deposits in Afghanistan outside the Panjsher Valley.

The deposits are located four hours by car north of Kabul near the village of Khenj. They are owned and exploited by the villagers of Khenj and are under the political control of the local mujahideen commander, Bismillah Khan, who was a member of Massoud's Northern Alliance. Individual mines or pits are owned and operated by teams of five to seven men. Agreements are made on sharing the proceeds and paying taxes.

The main mining areas are known as Darkhenj, Mikenj, Butak, Buzmal, Bakhi and Darun.

The Buzmal mine is the oldest and, because of the unsafe methods used by the miners, the most dangerous mine in the Panjsher. The 'mine' is actually a collection of dozens of pits and tunnels driven into the mountainside as deep as 50 meters. The mine itself is at an altitude of 14,000 feet. Danger to the miners is greatly increased by the number of Russian landmines scattered over the mountainside. The landmines have prevented expansion of the mines at Mikenj, for example. The proposed NGO will have to arrange for de-mining of these areas.

The quality of the emeralds is high, comparable to the best production of the Muzo mine in Columbia.

ii) Jegdalek ruby mine

This mine is the most accessible of all Afghanistan's gem mines, located about 100 km east of Kabul near the Jalalabad – Kabul road. Bowersox believes this mine has major potential. The crystals range from a light purple-red to a deep 'pigeon's blood' red. The best quality stones are similar to those found in Mogok, Burma. Bowersox has seen fair quality faceted stones as large as 10 carats, but good-quality specimens rarely exceed 5 carats.

Reports from miners there suggest that the deposits are large. Estimated output of Jegdalek with proper mining could be several million of dollars per year. Ownership and political control is similar to the Panjsher emerald mines.

iii) Nuristan

Nuristan is the most inaccessible gemstone mining area of Afghanistan and one of the most isolated and difficult places in the world. Practically all travel is by foot or horse. Little is known of the area's gem deposits, except what has been discovered in journeys by Bowersox and Bariand and Poulsen. These authors report that the Nuristan deposits are entirely pegmatite-hosted (that is, occurring in coarsely crystallised igneous rocks), and consist of tourmaline, kunzite, aquamarine, spodumene and beryl.

The known villages are Mawi, Suraj (the two which seem to be the most productive), Nilaw, and Korgal.

The pegmatite veins vary greatly in shape and size, but are generally veins or lenses up to 40 meters thick and up to several kilometres long. Crystals of tourmaline, spodumene and beryl occur in cavities up to 50 centimetres across. The crystals are remarkable for their high quality, size and diversity of colors.

The gem bearing areas of the pegmatite are usually encountered 10 to 20 meters below the surface. The Nuristan miners work all year round despite the harsh winter conditions.

Note: This area is to be visited again by Matthew Leeming in September 2003.

iv) Sar-e-Sang

The Sar-e-Sang Lapis lazuli mines located in Badakhshan in Northeast Afghanistan date back to at least 5,000 BC and are arguably the oldest mines in the world. Production is still good and there is inventory available.

During the 1970's Gary W. Bowersox and V. Prokofiev, UNDP, started a cutting operation in Kabul. This operation could readily be re-started by the proposed NGO and provide employment for returning refugees and exports for Afghanistan. Lapis is one of the easiest gems to cut and polish into gems and objects of art. Many of the skilled lapis lazuli workers have recently moved back to Kabul from areas in Pakistan.

5. The size of present and potential trade

The size of the trade has been erratic. Some locals have made large fortunes from gemstone mining.

Bowersox estimates that the country's entire production could be worth between \$300 and \$400 million if properly exploited. Below are his estimates of the various areas:

Area	Current Production (estimated)	Potential Production (est. year 2006)
Panjsher	\$2 million*	\$150 million
Jegdalek	\$100,000	\$2 million
Nuristan	\$ 150,000	\$5 million
Sar-e-Sang	\$ 500,000	\$2 million

*Production has decreased drastically here in the last two years due to a need for technical assistance in locating veins and the lack of manpower due to military commitments in Kabul. Also, mining and blasting techniques need revamping in order to continue mining where unstable ground is a serious problem.

Bowersox estimates that before the Taliban war, the annual production of emeralds in the Panjsher was worth \$10 million. In 1991, he estimated that 5,000 villagers were engaged in emerald mining.

With peace, technical assistance, proper equipment, local support and training we estimate the total potential of 300-400 million USD per year in ten years.

6. Recent technical advances in geo imaging and ground radar:

New satellite spectrometers developed in the last few years can now be used to search for new mining areas. Combining these techniques with ground proofing and sample techniques should produce new mining potential.

The US-launched LANDSAT satellites launched in the 1970s supplied spectral data in 7 bands with a maximum ground resolution of 10 meters. However, satellite spectral data is now available in 132 bands and higher resolution, enabling a much more detailed examining of surface geology. For example, the geological creation of emeralds requires a combination of beryllium and chromium. New satellite sensors can identify these elements in rock-forming minerals and pinpoint their exact location on the ground. Utilizing desktop mapping software such as MapInfo, the satellite information can be overlaid on topographic maps and other information to identify where new gemstones such as emeralds may occur.

7. Fieldwork

While remote sensing can tell us where to look, gemstone deposits themselves are small and can only be located on the ground. Most gemstone producing areas of the world derive much of their production from gemstones that have collected in rivers and streams below the mines. Typical gem minerals are very hard and can be found in streambeds many miles from their source. For this reason, gemstones and their accessory minerals are perfect geochemical indicators. In the words of Gary Clifton (whose biography is given in Appendix 1) “It is my opinion that geochemical sampling can provide accurate information on the location of prospective rock formations and the locations of actual gemstone deposits.” New areas would be prospected by collecting samples of stream sediments and examining the material under a microscope. Gemstone minerals such as tourmaline, beryl and spodumene, as well as their accessory minerals, are easily recognized; indeed, local Afghani’s could be trained to do most of the sample examination. The location of sediment samples containing fragments of these minerals would be examined in detail by field crews. Additional sediment samples, examined on location in the field, would allow the crews to track the gemstone minerals back to their source.

8. Proposed Activities of the NGO: Phase One: The 2003 Expedition

Since the 1999 GeoVision expedition, technical advances in satellite geo-sensing, spectral analysis, and ground radar described in the previous section have made an order-of-magnitude improvement in what can be achieved by a similar study utilizing today’s technology.

The proposed expedition will resume previous projects of geologically surveying of pre-selected zones, helping locals to re-open mines and providing training in surveying, mining, and blasting techniques.

Personnel

The expedition will be comprised of the following:

Six foreign mineralogists, geologists and gemologists – most holding advanced degrees and having many year’s experience of fieldwork in Afghanistan. Four of these professionals have worked together before in Afghanistan under GeoVision’s aegis.

A seasoned crew of eight Afghan professionals, headed by Khudai Nazir Akbari, Mr. Bowersox’s partner in explorations in each of the last fifteen years, and a respected mujihad.

The objectives of the 2003 expedition are to complete a formal study with recommendations for the NGO being here proposed.

Activity of the Proposed NGO:

Phase One: Conduct survey of existing mining infrastructure, extent of known gemstone mineralization, and potential for new gemstone discoveries.

- a) An action plan to revitalize existing mining operations based on geologist’s estimates of deposits and an audit of necessary equipment. Implementation will substantially increase employment in mining activities.
- b) A long-range organizational, staffing and equipment plan for mining areas
- c) Obtaining written permission from tribal and local leaders in the Panjsher, Badakhshan, Nuristan and Jegdalek for future operations.
- d) A survey of current production and employment figures
- e) An a scientifically based estimate of future production
- f) An accurate estimate of future investment needed.

Phase Two: Training Afghans in exploration, mining and marketing techniques

Phase One will have established a picture of the resources and needs of the gem-mining sector in Eastern Afghanistan. The next phase will be to establish a scientific and educational Institute (The

Ahmed Shah Massoud Memorial Institute) to help Afghans exploit these resources for their own benefit.

Educational activities will cover the following subjects

- How to locate gem and mineral deposits
- How to evaluate gem deposits
- How to operate mines and equipment needed
- How to operate mines safely
- How to identify and grade gemstones
- How to increase mine production
- How to increase profits with the proper care and handling of gem crystals
- How to increase cash flow through improved marketing
- How to develop computer models and maps for future exploration
- How to establish an economic geology study to determine the value of the deposits.

9. Exploitation of Afghanistan's other mineral resources

The plan for the proposed NGO relates only to gem mining. This will provide immediate employment, income to the inhabitants of Afghanistan, and hard currency revenues for the government. However, the gem business could kick-start the entire mining resources sector, which could form a major economic base for the country. Afghanistan is rich in mineral resources and its location is central to many expanding economies in southern Asia. Properly planned and developed, mineral resources could make Afghanistan an economic powerhouse in the region.

The exploitation of these resources requires large-scale investment and international mining companies will not invest in these deposits until the Afghani government and military situation are stable. Gemstone deposits do not require large investment, but foreign commercial mining companies are not interested in gem mining because of the low income potential. This is why international agency funds are the key to any improvement or expansion of the gem mining industry in Afghanistan. Without this type of funding, little can be accomplished to better the conditions of the Afghani gem miner or, in the short term, expand the tax base that is so vital to the country's economy.

Aid money would be distributed under strict guidelines to the small co-operatives and community leaders who control the mines, as emerald mining is currently controlled in the Panjsher. Distribution of funds and the purchase of goods and materials would be overseen by NGO team members or their chosen representatives in each mining district. Because the funds would be directed at improvements in mining-related activities, rather than establishment of new infrastructure, the cost-benefits will be great relative to the amount of money spent. The Afghani miner is a hard-working and efficient and will make the best use of any investment that will improve his source of income.

Afghanistan's mineral resources are vast and will require an agency or institution to fully evaluate them and make them known to the international community for possible investment. Our vision is that the planned Massoud Institute would become a center of excellence for the discovery and exploitation of Afghanistan's mineral resources. Afghani and Russian geologists defined potentially economic deposits of many valuable metals, including copper, gold, uranium, thorium, iron, tin, lead, zinc, chromium, bismuth, chromite, coal, gypsum, tantalum/niobium, tungsten and rare earth's. The Massoud Institute would rebuild the database of mineral occurrences destroyed in the last decade and pave the way for exploitation of Afghanistan's metallic mineral deposits.

Appendix 1: 2003 Expedition team members

Foreigners:
Gary W. Bowersox
Gary Clifton
Derrold Holcomb
Matthew Leeming

Lawrence Snee
(other members to be selected)

Afghans:
Khudai Nazar Akbari
Mir Waees Khan Jegdalek
(other members to be selected)

Resumes can be viewed on the GeoVision, Inc. web site (<http://www.gems-afghan.com>)

- _ Information from Farhad Adad, Ministry of Foreign Affairs relating to the budget for FY 2002/3. –
- The government's prospective deficit for the year is over \$200 million.
- _ The Economist World in 2002
- _ Bowersox and Chamberlin, Gemstones of Afghanistan, 1995, Geoscience Press
- _ Ibid, pp. 184 -206
- _ Bowersox, The Gem Hunter, Robert Laffont, publication scheduled for late 2003
- _ Bowersox, Gemstones of Afghanistan, p. [check]
- _ Neilson & Gannon UNDP AF/G/74/002 Toronto 1977
- _ Bowersox, ibid, pp. 141 - 166
- _ Bariand and Poullen, The Pegmatites of Laghman, Nuristan, Afghanistan, The Mineralogical Record, vol. 9 no. 5, pp. 301-308 1978
- _ Gem Resources of Afghanistan, GWB personal notes
- _ [Gems and Gemology]

11 Budget

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