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# Transitional Islamic State of Afghanistan Mining as a Source of Growth

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## **Currency Equivalents**

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## Abbreviations and Acronyms

ADB	Asian Development Bank
AGS	Afghanistan Geological Survey
BGS	British Geological Survey
COW	Contract of Work
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
ESCAP	Economic and Social Commission Asia Pacific
ESIA	Environmental and Social Impact Assessment
IRR	Internal Rate of Return
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
LOM	Life of Mine
MMI	Ministry of Mines and Industries
NPV	Net Present Value
NSR	Net Smelter Return
PDAC	Prospectors and Developers Association of Canada
TISA	Islamic Transitional State of Afghanistan
UNDP	United Nations Development Programme
UXO	Unexploded Ordnance
VAT	Value Added Tax



## TABLE OF CONTENTS

Table of Contents .....	iv
1. SUMMARY AND MINING SECTOR STRATEGY .....	1
Background and Recent Developments .....	1
Mining as a Source of Growth .....	1
Current and Projected Minerals Production by Volume and Estimated Value .....	2
Obstacles To Sector Growth .....	2
Attracting Private Sector Investment .....	3
A Strategic Plan for Sector Growth .....	5
Reforms to the Legal, Taxation and Institutional Regimes .....	7
Specific Action Steps for the next two years .....	7
Time Frame .....	8
Additional World Bank Recommended Action Steps for the Next Two Years .....	9
2. MINING AS A SOURCE OF ECONOMIC GROWTH .....	10
Background .....	10
Current Production and Estimated Gross Market Values .....	12
Projected Mining Development and .....	13
Economic Contribution (next five years) .....	13
3. ATTRACTING NEW INVESTMENT .....	18
What Investors Want and the Lessons of Mining Sector Reform .....	18
Geological Exploration and the Role of Geo-Science .....	20
Why Is Geo-Science Important? .....	23
4. LEGISLATIVE AND REGULATORY ENVIRONMENT .....	25
Successful legal and regulatory regimes in Mining .....	25
5. MINING TAXATION AND FISCAL CONDITIONS .....	31
Current status of tax and royalty laws .....	31
Designing a mining tax regime that will attract investment .....	32
International Standards And Best Practices .....	36
Tax Administration And Collection .....	37
6. INSTITUTIONAL ARRANGEMENTS .....	41
Background .....	41
A Proposed New Structure for MMI .....	44
ANNEX 1 .....	46
POSSIBLE ELEMENTS OF A MINING SECTOR POLICY AND STRATEGY .....	46
ANNEX 2 .....	53
ADDITIONAL ACTION STEPS FOR SECTOR RECOVERY OVER THE NEXT TWO YEARS .....	53
ANNEX 3 .....	56
IMMEDIATE ASSISTANCE STRATEGY TO THE COAL SECTOR .....	56
ANNEX 4 .....	60

ASSISTANCE TO THE CONSTRUCTION MATERIALS SECTOR OVER THE NEXT TWO YEARS .....	60
ANNEX 5 .....	62
ASSISTANCE TO THE GEM AND ORNAMENTAL STONE INDUSTRY OVER THE NEXT TWO YEARS.....	62
ANNEX 6: .....	64
A STRATEGY TO IMPROVE UNDERSTANDING OF THE MINERAL RESOURCE POTENTIAL .....	64
ANNEX 7 .....	71
TERMS OF REFERENCE FOR TASKS AND PROFESSIONALS NEEDED TO SUPPORT SECTOR RECOVERY (SUPPLEMENT TO ANNEX 5).....	71
APPENDIX A : MINERAL POLICY SPECIALIST .....	72
APPENDIX B: INTERIM TECHNICAL ASSISTANCE TO COAL MINES.....	75
APPENDIX C: FEASIBILITY STUDY FOR AN ARTISAN CRAFTS FACILITY AND ARTISAN CRAFTS EXCHANGE .....	78
APPENDIX D: DEVELOPMENT OF A QUARRY EXTENSION SERVICE IN AFGHANISTAN .....	81
APPENDIX E: DEVELOPMENT OF A SMALL-SCALE MINER EXTENSION SERVICE.....	83
APPENDIX F: PRE-TENDER PROGRAM, AYNAK COPPER DEPOSIT .....	85
APPENDIX G: ESTABLISHMENT OF A MINES CADASTRE OFFICE .....	90
APPENDIX H: A CORPORATIZATION PROGRAM FOR MINING ASSETS .....	94
ANNEX 8 .....	96
CURRENT MINERAL PRODUCTION .....	96
Potential Mineral Deposits .....	103
ANNEX 9: .....	108
TENDERING OF MINERAL PROPERTIES.....	108
ANNEX 10 .....	111
IMPROVED GEOSCIENCE (SUPPLEMENTAL TO ANNEX 6).....	111
List of publications on the geology and mineral resources of Afghanistan .....	112
Quality of Geo-Information and “Gaps” .....	114
Promoting Mineral Resources .....	118
ANNEX 11: MINERALS PRODUCTION AND PRICES .....	121
ANNEX 12: ESTIMATES OF ECONOMIC CONTRIBUTION NEXT FIVE YEARS .....	122
Notes to Table on Economic Contribution.....	123
ANNEX 13: Maps.....	125

## **1. SUMMARY AND MINING SECTOR STRATEGY**

This Note examines the mining sector as a potential source of growth for the Afghanistan economy. It assesses the existing minerals production and potential for development in terms of actual or possible benefits streams for the economy. It addresses the challenges the government faces to put into place an enabling environment which will regularize existing production and stimulate new investment. Finally, assuming that conditions in the sector do improve, the Note asks what would be the possible economic impacts over a five year time horizon and, more speculatively, 10 – 12 years into future.

### **BACKGROUND AND RECENT DEVELOPMENTS**

Historically, Afghanistan's solid minerals production was about 1% of GDP, consisting primarily of coal, quarry materials, marble and dimension stone, industrial minerals, some metals, and semi-precious stones. The existing production facilities have suffered dramatically during the political difficulties and (officially declared) production has fallen. At present, while minerals – coal, quarry materials, gemstones - are produced, the production is largely outside of the direct knowledge or control of the central government. Reliable statistics on minerals production and activities are virtually non-existent. The government does not receive any royalties or other taxes on this exploitation of non-renewable resources. However, there has been a marked increase in demand for minerals and quarry materials to supply the needs of the road building program and booming general construction industry. There is thus considerable scope in the immediate term to improve the existing production and, over the longer term, to stimulate new investment in the sector.

### **MINING AS A SOURCE OF GROWTH**

Mining represents a source of economic growth in Afghanistan, offering employment, taxes in the form of royalties and taxes, materials to re-build the nation, and strong foreign exchange earnings and/or savings. If reform measures described herein are undertaken, this Note estimates that the gross annual market value of solid minerals produced could increase from the estimated US\$ 60 million currently to US\$ 253 million per annum by 2008 (four-five year time horizon). For this to occur, public sector investment of US\$ 100 million and private sector investment of US\$ 360 million will be required. The sector could generate:

- value added of US\$ 108 million yearly
- royalties and other taxes of US\$ 18 million yearly

- nearly 7,500 new jobs
- a positive export balance of US\$ 66 million

### Current and Projected Minerals Production by Volume and Estimated Value

Commodity	Volumes (tonnes)		Values (US\$ million)	
	Current	Projected	Current	Projected
Coal	140,000	800,000	10.0	40.0
Quarries <sup>1</sup>	2,700,000 M <sup>3</sup>	5,000,000 M <sup>3</sup>	32.0	60.0
Sand	500,000 M <sup>3</sup>	1,000,000 M <sup>3</sup>	15.0	30.0
SALT	None	54,000	None	18.0
Gemstones	Unknown	Unknown	3.0	5.0
Copper	None	50,000	None	100.0
Totals			60.0	253.0

Source: World Bank staff estimates

This five-year growth scenario will be achieved by emphasizing two critical paths. First, the formalization of existing quarry materials and gemstone production, together with immediate assistance to existing coal mines. Much economic value added and tax revenues can be captured from these operations if they are brought under government hegemony. Modest investment in up-grading some of the coal mines could not only improve production but also working and safety conditions in the mines. Second, it should be possible, if appropriate policy measures are adopted, to attract new investment to the mining sector. In particular, good potential exists for new private sector investment in a salt mine, privately funded exploration programs, gemstone cutting and polishing, and stone handicrafts production. As well, a world class copper deposit at Aynak could attract global investor interest through a competitive tender process. The timing on this tender, and the overall sector strategy, is good as many commodity prices continue to strengthen. A longer term growth scenario – ten to twelve years into future – could see the development of very large iron ore deposits, industrial scale coal mines for power generation, one or two gold mines and other industrial minerals production facilities.

### OBSTACLES TO SECTOR GROWTH

Despite its excellent geological potential, Afghanistan must overcome a number of obstacles in order to develop its mineral resources. These include:

*Regulatory and Fiscal Deficiencies:* Modern minerals legislation, regulations, and fiscal measures for the mining sector do not exist at present, though the government is making some progress to put them into place.

*Institutional Deficiencies:* The public sector institutions responsible for mineral resources are not appropriately organized, staffed and equipped to supervise activities. Several key offices, for instance to administer mineral titles and audit

<sup>1</sup> Includes crushed stone, gravels and other quarried materials for road and general construction.



production, do not exist. In addition, the organizational structure does not reflect the new emphasis of the role of State as regulator of the sector instead of as operator of mines.

Lack of central government control: local strongmen or warlords effectively ignore central government directives and control access to, and exploitation of, the mineral resources. Some prospective areas, principally in the south along the border with Pakistan, are threatened by the Taliban and other rogue forces.

Lack of Infrastructure: the national infrastructure – roads, energy and water systems remain weakly developed. Significant efforts are underway to improve the road links with the benefit of various donor funding. Nevertheless, lack of infrastructure will remain a practical (and financial concern) for mining developers.

Shortage of trained workforce: as in many other developing countries, development and operation of mines in Afghanistan is hindered by a shortage of skilled technical and managerial workers. The result is a high reliance on foreign labor and relatively long time frame for project planning and implementation.

Lack of local capital: the local capital market, at least in the formal institutional sense, is weakly developed and not scaled to mining investment requirements. Much of the required capital for the immediate future development of the sector will come from sources outside of Afghanistan, with perhaps remittances from Afghan expatriates.

Unexploded ordnance (UXO): anti-personnel and anti-vehicle land-mines are located in and around mineral producing and prospective areas. Despite considerable efforts to clear land-mines, Afghanistan has the highest concentration of unexploded ordinances in the world.

Investor Perception: the international perception of Afghanistan is of a high political and security risk country. This makes it difficult to mobilize funding for exploration and development on international markets. However, modest successes coupled with large unexplored, prospective terranes, could significantly change this perception.

### ATTRACTING PRIVATE SECTOR INVESTMENT

Mining is a high-risk and capital intensive industry. The Afghanistan government does not currently have the funds to invest in minerals development and, even if it did, such investment could not be justified due to other priorities and the risks inherent in mining. It will be necessary to attract private investment, from both domestic and international sources. Foreign investors, in particular, may be interested in Afghanistan not only because of its excellent geological potential but also because the country has missed a generation of modern prospecting methods that look for deposit buried below the ground's surface. Clearly, Afghanistan offers early entrants into the sector highly favorable ground.

The international mining industry is two-tiered, with (i) small venture-capitalized companies performing high-risk exploration and (ii) large, multinational mining houses developing mines. The industry is highly integrated with strong connectivity between the smaller exploration companies who vend significant discoveries to the larger mining houses. All companies compete to attract ongoing investment capital, requiring that returns to their shareholders are high and commensurate with the risks entailed in minerals investment. Allowing these companies to take the risk of minerals investment is essential for governments. However, governments must be vigilant to ensure that mining companies, local and foreign, comply with obligations and legal requirements.

Governments which have over the past thirty years implemented reforms of their mining sectors have realized marked increases in exploration, mineral development, and increased production. The international investment community will evaluate investment opportunities according to: (i) clear mining rights and title (mining legislation), (ii) attractive and competitive fiscal conditions (tax legislation), (iii) ownership and control of operations (mining legislation), (iv) political stability and transparency of governance (government institutions), and (v) availability of infrastructure. Thus, the mining policy and strategy of Afghanistan should emphasize improving the regulatory and fiscal regime as the basis to stabilize existing production and to attract much needed new investment.

**Estimated public and private-sector investment requirements, with corresponding economic contribution, for the next five years.**

Value Amounts in US\$ million.

<b>Commodity</b>	<b>Investment Public (Total \$)</b>	<b>Investment Private (Total \$)</b>	<b>Royalties (Year)</b>	<b>Value Added (Year)</b>	<b>Jobs persons (Year)</b>
Coal	25.0	50.0	0.800	8.0	1,500
Quarries, road const.	0.4	10.0	0.480	10.0	1,000
Quarries, genrl. const.			0.720	14.0	1,000
Sand			0.60	12.0	2,000
Salt	0.2	1.0	0.360	6.0	300
Gemstones	1.0	5.0	0.100	2.5	500
Copper metal	50.0	240.0	15.000	56.0	600
Handicrafts	0.5	2.0	NA	NA	NA
Exploration	20.0	50.0	NA	NA	500
<b>Totals</b>	<b>97.0</b>	<b>358.0</b>	<b>17.5</b>	<b>108.5</b>	<b>5,900</b>

Source: Bank staff estimates

## A STRATEGIC PLAN FOR SECTOR GROWTH

Given the obstacles to sector growth and the requirements to attract new investment, a sector policy and strategy for mining is being prepared by the government which may include the following strategic objectives and components.

### Strategic Objectives

The mining sector policy and strategy defines a comprehensive set of objectives to:

1. exert central government sovereignty and hegemony over non-renewable mineral resources located throughout the national territory;
2. stimulate and mobilize local and international private investment in minerals exploration, development and production;
3. ensure that mining operations are conducted in an environmentally and socially sustainable manner;
4. create job opportunities for Afghans and stimulate the development of spin-off and related industries;
5. increase tax revenues accruing to the government from mining operations and to provide for their equitable allocation and transparent management thereof;
6. promote scientific and geological investigation into the nature and extent of Afghanistan mineral resources and to make such information available to the public and potential investors;
7. strengthen government supervisory institutions to distinguish clearly the functions of regulator from the functions of owner/operator of State mining enterprises;
8. regularize small-scale mining and provide for adequate institutional and technical support of these activities;
9. apply internationally accepted standards and “safeguard policies” to questions of environmental protection, indigenous peoples, involuntary resettlement, and other aspects;
10. promote the transition to operate on a commercial basis of mineral producing enterprises which are currently state owned or reliant on the government.

### Strategic Components

In order to achieve these strategic objectives, the government will pursue a strategy which emphasizes several strategic components:

- Creation of a Modern Legal and Regulatory Framework: the Ministry of Mines and Industries is preparing a minerals law and regulations. The new minerals law will reflect international standards of quality, applies to all investors local and foreign, and contains special provisions for small and artisanal miners that are currently operating in Afghanistan. It will provide the basis for transparent allocation of mining titles to private entities.
- Adoption of an Internationally Competitive Fiscal and Mining Taxation Package: some good progress is being made to propose a fiscal and taxation package which will, on the one hand, ensure a reasonable fiscal burden on the enterprise while, on the other, ensure that government receive tax benefits commensurate with the

value of its non-renewable resource. Consistent with international best practice, the fiscal regime under consideration for the mining sector applies the general taxation system (Tax Law of 1964 as amended) with the provision for certain royalties to be collected on the value of extracted minerals. All tax and royalty payments are made to the central treasury.

- Strengthening of the Institutions Responsible for Management of Mineral Resources: the government institutions and departments responsible for the mining sector need to be strengthened in order to fulfill the new mandate given to them to oversee sector operations rather than intervene directly in minerals production. This will entail some re-deployment, training and re-skilling of staff. Emphasis should be given to training in negotiations with investors as well as how to monitor compliance with various regulations. While some initiatives in this respect have been undertaken, much more needs to be done to re-structure and strengthen government oversight institutions, particularly the Ministry of Mines and Industries.
- Filling Information Gaps With New Geoscience Programs: although significant quantities of information were saved by personnel of the Afghanistan Geological Survey during the civil war, information gaps still exist. In addition, there is a need to apply modern geological thinking to areas having a known mineral resource potential, but lacking in an understanding of how large that potential may be. Geologic mapping and resource assessment programs are needed, for which the government will receive some foreign assistance.
- Regularize and Maintain Existing Production: as noted above, coal, quarry and gemstones are presently produced. These existing operations, if brought under government hegemony through the new legislation and regulations, represents the best opportunity for realizing mid-term economic gains. This will entail special programs to re-habilitate in the short term certain coal mines, formalize operations of quarries, improve productivity through modest technical extension services, creation of special units for small scale mining, and other activities.
- Environmental and Social Safeguards: the global mining industry increasingly adheres to standards for acceptable performance on social and environmental issues. The mineral policy and development strategy reflects these standards by proposing reporting requirements that ensure compliance.

## REFORMS TO THE LEGAL, TAXATION AND INSTITUTIONAL REGIMES

<b>Legal &amp; Regulatory (Chapter 4)</b>	<b>Fiscal &amp; Mining Taxation (Chapter 5)</b>	<b>Institutional Strengthening (Chapter 6)</b>
<ul style="list-style-type: none"> <li>• <u>Mineral Ownership</u>: State ownership of all mineral resources existing in their natural state; a clear identification and mandate of the government institution with the power to grant private access to mineral rights;</li> <li>• <u>Regulatory Authority</u>: The state acting as regulator of private sector mining, rather than as explorer, operator, or equity-owner;</li> <li>• <u>Mineral Rights</u>: Basic terms, and the procedures and criteria for granting such rights – made available to the private sector;</li> <li>• <u>Security of tenure</u>: transferability of title, other investor rights;</li> <li>• <u>Disposition of State Assets</u>: Successful tendering of key assets.</li> <li>• <u>Environmental Protection</u>: create effective environmental law and regulations.</li> <li>• <u>Special considerations</u>: Special regulation of construction materials and small scale mining.</li> </ul>	<ul style="list-style-type: none"> <li>• <u>Legislation</u>: Tax legislation that is simple, clear, and stable; designing a tax law that will attract investment by providing a fair participation by government and investors, stability over time, transparency and a level playing field, easy to understand and administer, and is internationally competitive.</li> <li>• <u>Competitive Taxation</u>: Royalties that reflect international standards and best practices; use accelerated depreciation instead of tax exemptions; recognize the capital-intensive nature of the industry, in assessing custom duties.</li> <li>• <u>Effective Administration</u>: Ensure that the Ministry of Finance and the Ministry of Mines and Industries share their knowledge where tax provisions affect the mining sector; effective administration and collection;</li> <li>• <u>Setting Priorities</u>: Focus on near term production and royalties from industrial minerals, coal, and base metals.</li> </ul>	<ul style="list-style-type: none"> <li>• <u>Mines Cadastre</u>: for the effective issuance of mining rights and assert government control;</li> <li>• <u>Mining Inspectorate Unit</u>: monitor and control of mining sector activities, as well as the transparent and uniform enforcement of laws and regulations;</li> <li>• <u>Geological Survey</u>: for acquiring and organizing geoscience information; modernizing the geoscience database, developing, maintaining information and mineral sector activities using GIS;</li> <li>• <u>One-Stop Shop</u>: for investor inquiries, providing necessary data and information, assisting private sector companies in contacting official government departments.</li> <li>• <u>Develop environmental and social management capacity</u>: with emphasis on safeguard policies for vulnerable groups.</li> <li>• <u>Small Scale Mining</u>: extension services to improve the productivity and living / working conditions of small scale miners.</li> </ul>

### SPECIFIC ACTION STEPS FOR THE NEXT TWO YEARS

As the Afghanistan minerals and mining sector moves towards recovery and growth, several specific actions and/or programs are recommended. These combine those proposed for funding in the national development budget by the Ministry of Mines and Industries as well as recommendations of the World Bank for additional actions proposed in the present Note.

**Action Steps As Presented in Current National Development Budget: 1381 - 1384**

<b>Action</b>	<b>Outcome</b>	<b>Status<sup>2</sup></b>	<b>Time Frame</b>	<b>TORs</b>
Prepare geology and mines assessment and related strengthening of AGS	Identification, prioritisation and economic evaluation of metallic and industrial minerals; improve capacity at AGS to perform as geological survey	MMI, BGS	May 2004	
Assess existing and potential coal reserves	Identification, prioritisation and preliminary economic evaluation of coal deposits and reserves	MMI, USGS	August 2004	
Up-date studies of Aynak and Haidjak iron ore deposits	Prepare pre-tender documents for Aynak and up-date economic knowledge of Haidjak	MMI, WB, BGS	September 2004	
Rehabilitation of Sabzak coal mine	Part of interim coal strategy above, to provide assistance to improve production, health and safety	MMI, WB, FSF	June 2004	
Rehabilitation of coal mines in Dudash, Karkar, Daresuf, Eshposta	Part of interim coal strategy above, to provide assistance to improve production, health and safety	MMI, WB, FSF	June 2004	
Rehabilitation of Takcha salt mine	Develop production of locally produced salt	MMI, FSF	December 2005	
Rehabilitation of quarries in Kabul area	Part of quarries extension service to improve production, health and safety at quarries	MMI, WB	December 2005	
Repair of AGS and MMI buildings	Improve working conditions in main public service buildings	MMI		
Build capacity at MMI	Part of BGS and USGS programs, supplemented by WB programs	MMI, BGS, USGS, WB		

<sup>2</sup> MMI = Ministry of Mines and Industries; MOF = Ministry of Finance; WB = World Bank; IMF = International Monetary Fund; BGS = British Geological Survey; USGS = United States Geological Survey; FSF = Feasibility Studies Fund

**ADDITIONAL WORLD BANK RECOMMENDED ACTION STEPS FOR THE NEXT TWO YEARS**

<b>Action</b>	<b>Outcome</b>	<b>Status<sup>3</sup></b>	<b>Timeframe</b>	<b>TORs</b>
Complete Minerals Law and Regulations	Transparent mechanism to grant and monitor mineral rights	In progress MMI, WB, MOF, MOJ	April/May, 2004	
Promulgate amendments to 1964 general tax law	Clear fiscal and taxation regime for natural resource development	In progress MOF, MMI, WB, IMF	April/May 2004	
Mineral Policy Specialist	Assist MMI strategic plan and programs in mining sector; policy and negotiations advice	MMI, WB, consultants	June 2004	Annex 7 (A)
Interim assistance to coal sector	Maintain production and improve working conditions	MMI, WB, consultants	June, 2004	Annex 7 (B)
Feasibility studies for lapis lazuli and other high-quality artisan crafts and export of gemstones	Create a sales and export facility for semi-precious stones and artisan crafts.	MMI, WB, consultants		Annex 7 (C)
Establish quarry extension service	Improve productivity, environment and safety at quarries	MMI, WB, consultants		Annex 7 (D)
Establish small scale mining extension service	Improve productivity, environment, and safety at small scale mines	MMI, WB, consultants		Annex 7 (E)
Prepare data package for tender of Aynak Cu	Attract international investment through tender of Aynak copper deposit	MMI, WB, consultants	September 2004	Annex 7 (F)
Establish mines cadastre office	Provide for clear and transparent issuance of mining titles	MMI, WB, BGS, consultants	June 2004	Annex 7 (G)
Reorganize MMI production departments	Put onto commercial basis existing "production" departments in MMI	MMI, WB, consultants	November 2004	Annex 7 (H)

<sup>3</sup> MMI = Ministry of Mines and Industries; MOF = Ministry of Finance; WB = World Bank; IMF = International Monetary Fund; BGS = British Geological Survey; USGS = United States Geological Survey; FSF = Feasibility Studies Fund

## 2. MINING AS A SOURCE OF ECONOMIC GROWTH

This Note examines the potential of the mining sector to be a source of growth for the Afghanistan economy. In order to address this fundamental and strategic issue, this Note will ask and provide answers to three principal questions. First, what is the potential in Afghanistan for large and small scale minerals development? Second, given the potential, what are the constraints for development of the sector in terms of the enabling environment (policy, regulatory, taxation) for private investment, institutional capacities, infrastructure and other constraints? And, third, what would be a reasonable sector development scenario over the next five years and what could be the benefit streams (production value, taxes, jobs, value added, etc.) generated under such a scenario?

It is intended that the Note serve as a baseline document to help the government reflect on sector policies and strategies and to provide a “roadmap” for development of the sector. The roadmap will help the government to know where it wishes to go, how it intends to get there, what obstacles and impediments it may face along the way, and what it can reasonably expect to receive in terms of economic and social impacts. This, in turn, will serve as the basis for the development of enabling legislation and fiscal mechanisms for the sector as well as for institutional strengthening required to stimulate investment.

### BACKGROUND

Mining can, and does, contribute to economic development and human well-being. If conducted in an environmentally sustainable manner, exploitation of mineral resources can provide substantial tax revenues to central and local governments, create direct and indirect jobs, and stimulate spin-off industries in and around the mining operations. These beneficial effects and the development of a vibrant mining sector have so far eluded Afghanistan. While the country has excellent geological potential the mining sector is little developed. Three difficulties currently hinder development of the sector.

1. *Difficult transition from a centrally planned to a market economy.* Taking inspiration from the practices in the Soviet Union, previous government policies fostered the use of State institutions to find and develop mineral resources. This burdened the central government with subsidies for inefficient production at state owned mines as well as high risk investment in new exploration. The mining legislation and taxation arrangements (to the extent that they exist at all) for the sector, do not reflect modern best practices and are not conducive to new private sector investment. Additionally, the mandates, functions, organization and staffing of government institutions responsible for the sector are not responsive to modern requirements.



2. *Problems of a post conflict country.* For the past 25 years the security situation in the country has limited the ability of the central government to establish national sovereignty over mineral resources and to promote exploration and development of them. This security situation remains a pre-occupation at the present time and constitutes a hindrance, though not complete blockage, for sector development.
3. *Isolation from international trends and practices.* Since the early 1980s, there has been little contact with the international mining industry or scientific developments. While the basic training of many government officials is good, it is nonetheless dated and staff have not been able to work in the field nor benefit from international contacts.

Over the past 30 years there has been a considerable amount of research on Afghanistan's mineral resources and potential conducted by the government, sometimes with the assistance of international donors. To date, attempts to develop the iron ore and copper deposits as well as others have not proven successful, though some interest in these deposits is now being manifested by potential investors. Exploration has identified occurrences of gold, barite, talc, chromites, and other minerals. There is a considerable semi-precious stone industry undertaken mainly by artisans, which production is not declared to the central government. Finally, the country has reasonably good quality coal resources and some of this is mined for domestic and industrial purposes as well as fuel for electricity generation. The existing small industrial sized coal mines are marginal due to antiquated machinery and lack of new investment. However, there is considerable small scale production. Moreover, coal demand and prices in urban centers has risen rapidly due not only to domestic energy needs during the winter months but also to increasing industrial demand to fire construction bricks.

Afghanistan has excellent geological potential and there has been a considerable amount of exploration and deposit identification conducted over the past 30 years. Historically, however, mining has only contributed about 1% of GDP and large scale mining development has not taken place. The stagnation of the mining sector has been exacerbated by the political difficulties of the past 20 years. The government is aware that development of mineral resources will require investments in excess of government abilities and thus seeks to establish conditions and an enabling environment which is conducive to attracting and retaining investment by both private local and international groups. At the same time, the central government is conscious of the need to exert its hegemony through appropriate legislation over valuable non-renewable mineral resources which are, at present, being exploited and the revenues captured by factional groups operating in the country. The privatization and/or leasing to private groups of existing state owned mining enterprises is, at present, held up by the lack of adequate mining legislation. Enabling legislation and a proper mineral concession system is needed to establish order in the quarry and construction materials sector. The demands of reconstruction of physical infrastructure is requiring vast quantities of locally sourced quarry minerals, the exploitation of which carries the additional benefits of absorbing large quantities of labor and spawning ancillary industries. Finally, the small scale mining sector is, at present, wholly unregulated and occupies large numbers of persons in

difficult security, hygienic, and environmental conditions. To achieve these objectives internationally competitive mining legislation and fiscal measures are necessary.

This Note examines the potential for the mining sector to be a source of growth for the national economy. It assesses the constraints to such development and makes recommendations to help overcome these constraints. The Note also estimates the possible economic benefits streams which could come about if the mining sector were to grow and compares the possible five and longer term scenarios to the current situation. Above all, this Note seeks to establish a baseline from which the government and donors may refer when considering measures to stimulate development of the sector.

### CURRENT PRODUCTION AND ESTIMATED GROSS MARKET VALUES

At the present time, reliable statistics on officially declared production of mineral commodities are virtually non-existent. There is a disconnect between what the Ministry of Mines and Industries plans for production and the actual amounts produced, even from State owned enterprises. The situation is further complicated by supposedly large, but undeclared, production from small scale non-registered miners. Research was conducted amongst producers and consumers of mineral products and local market prices as of November, 2003 for selected mineral products (see annex). It is estimated that the total value of coal production, at the official and real market prices, is US\$ 10 million per year. Important quantities of quarried sand and gravel are used for general re-building as well as construction of 3,000 kilometers of new highways currently under construction or planned over the next few years. It is estimated that the annual value of sand and gravel production is US\$ 56 million. Gemstones, which are clandestinely exported, are estimated to value US\$2.8 million per year. In addition, large quantities of salt are consumed, which is mostly imported. Salt is estimated to carry a market value of US\$22 million per year. Thus, the total value of minerals produced is just under US\$70 million. The estimated total value of minerals consumed is just under US\$ 100 million.

#### *Estimated Annual Current Production of Selected Mineral Products*

Commodity	Estimated Production	Market Price US\$/unit	Estimated Value US\$ mln	Comments
Coal, metric tonnes	140,000	44 – 70	10.1	Official and free market price
Crushed stone, M3	2,702,840	10 – 19	32.0	
Sand, M3	500,000	30	15.0	
Gemstones			2.8	
<b>Totals</b>			<b>59.9</b>	

Source: Bank staff estimates

These figures should be taken with an extreme measure of caution as they represent very rough estimates. However, they are significantly higher than those reported in the few official government statistics available and are, in themselves, probably underestimates.

The government does not collect any form of royalties or taxes on the production of these non-renewable resources, though relatively small service fees may be paid to the Ministry of Mines and Industries for certain operations. No information is available on employment, number of households dependent, value added, production costs, or other information for the mining sector nationally. Most mines production takes place in rural areas, some of which are not firmly in control of the central government.

**PROJECTED MINING DEVELOPMENT AND  
ECONOMIC CONTRIBUTION (NEXT FIVE YEARS)**

Given the resource base, the existing conditions, possible investor perceptions and international context, one may hypothesize on a short (5 years) and medium term (10-15 years) mining growth scenarios. Over the next five years, if the government can establish its hegemony over the mineral resources, Afghanistan could increase declared mineral production and the benefits streams that it could produce. To accomplish this, the government should focus on two aspects: first, regularizing existing small scale production and, second, attracting and retaining new private sector investment. The key to doing so is the adoption of appropriate government policies and programs to stimulate private sector investment, rather than direct government investment in operations.

**Afghanistan Mining Sector: Growth Scenario  
Projected Five Year Investment Requirements and Annual Economic Contribution  
In \$US million**

<b>Commodity</b>	<b>Public Investment Total</b>	<b>Private Investment Total</b>	<b>Projected Annual Production Value</b>	<b>Annual Value Added</b>	<b>Royalties and Taxes Annual</b>	<b>Jobs persons</b>
Coal	25.0	50.0	40.0	8.0	0.80	1,500
Quarries	0.4	10.0	60.0	24.0	1.20	2,000
Sand			30.0	12.0	0.60	2,000
Salt	0.2	1.0	18.0	6.0	0.36	300
Gemstones	1.0	5.0	5.0	2.5	0.10	500
Copper	50.0	240.0	100.0	56.0	15.0	600
Handicrafts	0.5	2.0				
Exploration	20.0	50.0				500
<b>Totals</b>	<b>97.0</b>	<b>358.0</b>	<b>253.0</b>	<b>108.5</b>	<b>18.1</b>	<b>7,400</b>

Source: Bank staff estimates

Estimates of the economic impacts over the next five years are necessarily conjecture, but reasonable assumptions have been used. If the government were to adopt and implement the reform measures necessary and if the security and other political considerations in the country were to permit development, the value of minerals produced in Afghanistan could more than double from existing levels, to US\$253 million per annum. The possible public and private sector investment necessary over the five year period would be US\$100 million and US\$360 million, respectively. The annual economic benefits

streams would include US\$108 million in value added, US\$18 million in taxes and royalties, and the creation of nearly 7,400 jobs. These figures per mineral commodity are summarized in the following table. It is emphasized once again that these are very rough estimates and should in no case be considered as definitive projections. It is also worth noting that these figures take no account of the multiplier effect of secondary industries that result from the development of new mining. These will further add to job opportunities in both the local, rural communities around new mining developments and more widely as service industries develop to meet primary needs. The total economic impact of such developments is difficult to estimate but could be very substantial.

#### A REALITY CHECK ON THE NUMBERS

Because of the difficulty in obtaining accurate estimates of minerals production, it is useful to compare consumption figures for selected mineral commodities in other countries.

- **Fired bricks:** use clays and coal. In Kosovo, a post conflict country with a population of 2.8 million, it is estimated that 40,000 new homes are being built yearly, each consuming 5,000 bricks. Total brick consumption is 200 million. Extrapolating for Afghanistan's larger population, one might suppose 300,000 new houses, for a total brick consumption of 1.5 billion. Assuming it would require 1 tonne of coal to fire 1,000 bricks, total coal consumption for this use alone could be 1,500,000 tonnes, well above the reported production figure.
- **Salt:** average salt consumption worldwide is 30 kilograms per person per year. The figure used in Afghanistan is 2 kilograms per person per year, less than one-tenth the world average.
- **Crushed stone, sand and gravel:** consumption of these quarry materials in the United States averages 9 tonnes per person per year. The estimate for reported quarry materials production in Afghanistan is 0.09 tonnes per person, a figure well below the supposed needs for reconstruction.

The first phase of the five year growth scenario is based on **regularizing existing production**.

- **Coal mines re-habilitation.** An interim emergency re-habilitation program may be necessary to remedy some of the more severe health and safety problems at the existing mines. Thereafter, the coal mines should be put on a commercial basis so they may attract private capital investment. It will be necessary to distinguish the regulatory from operator functions within the ministry departments

responsible for coal. Finally, appropriate pricing policies need to be applied and the coal price in the markets liberated. If these measures are taken, then the value of coal production could increase from the current US\$ 10 million to US\$ 40 million.

- **Quarry and construction materials (sand and crushed stone)** are tied to the reconstruction effort, principally the building of 3,000 kilometers of highways and also general construction and rehabilitation. If the quarry, sand and crushed stone operations are brought under government hegemony the annual value of production could increase from the present US\$55 million to over US\$90 million. It may also be possible to generate US\$1.8 million per year in royalties from this production (assuming a 2% royalty), though caution should be exercised with respect to existing contractual or other arrangements with the producers.
- **Small scale mining of gemstones.** Through a coherent program of regularization, licensing, marketing and technical support to these activities, it should be possible to increase the production value from the existing US\$2.8 million to US\$5 million. It is acknowledged, however, it may take some time for the local interests in the principal producing areas of the Panshjer Valley to accept central government authority. A key element for the stimulation of the small scale gemstone sector could be the establishment of a cutting and polishing training center in Kabul. If sensible policies in respect of pricing and declaration to the government of cut and uncut stones were put into place, a portion of the currently smuggled gemstones as well as additional value added could be accounted.

Over the second phase of the five year time period, **new investments** in the sector could be envisaged. Some possible candidates for investment and development include:

- **Salt mine development,** given the high consumption of salt in Afghanistan (around 2 kilograms per person), could present a viable opportunity for a private sector investor. Exploitation of local salt would not only displace the current imported salt but could also result in significant health benefits to the population as a whole if iodine were to be added. It is estimated that 54,000 tonnes of salt, worth an estimated US\$ 21.6 million, is consumed in Afghanistan yearly.
- **New exploration investment and promotion.** Afghanistan, given its size and resource base, could conservatively attract US\$10 – 20 million per year in exploration. This would require stable security conditions in rural areas as well as a modern and attractive enabling environment. Additionally, some deposits for which the government possesses adequate exploration data and information could be promoted for private sector investment, if a program to do so were put into operation.

- **Aynak copper mine tender and development.** A number of parties have expressed interest in developing this copper deposit. The Aynak deposit is of exceptional quality and there is a growing demand in Asia for copper (especially in China). Investment in Aynak could be attracted through an international tender operation. Studies would be conducted on the best method to proceed. A first phase of the project could involve substantial investment in development of the oxide ore reserves and produce copper metal (cathode) through solvent extraction electro-winning. This would alleviate requirements for heavy transportation infrastructure associated with the production of concentrates. The first phase of Aynak could produce copper at an annual value of US\$100 million, with a value added of US\$ 56 million,

**ECONOMIC BENEFITS STREAMS:  
THE CASE OF SEPON COPPER MINE**

In Laos, an Australian company is building a medium sized copper mine, to produce around 50,000 tonnes of copper metal per year with a total market value of US\$100 million. The initial capital investment required is US\$240 million. According to estimates, when in production the mine will contribute yearly:

- US\$ 56 million in value added for the economy
- US\$ 15 million in taxes
- US\$ 62 million in export balance
- US\$ 19 million in local purchases
- 600 new and high paying jobs

While it is impossible to compare directly the Sepon operation with a possible copper mine at Aynak, the amounts cited can give some indications of the economic contribution.

and US\$ 15 million in taxes and royalties. Longer term, it should be noted that the geological belt beginning in Iran and moving east through Baluchistan in Pakistan and through Afghanistan is highly prospective for copper mineralization. It is possible to conceive of a regional approach to planning for the construction of a regional copper smelter, perhaps making use of Iran's ample energy resources or Afghanistan's natural gas.

- development of a **handicrafts and dimension stone industry**, based on good quality deposits of lapis lazuli, onyx and marble. Demand from the construction industry is growing for dimension stone. Also, a handicrafts industry based on lapis lazuli and other ornamental stones could absorb large amounts of labor, if properly trained. Insufficient data exists at the present time to estimate production values and other economic benefits streams.

### Speculative Scenario

Beyond the five year development scenario it is possible to speculate on several other mining developments. These could be:

- Development of a **small-medium sized gold mine**, to produce 4 metric tonnes of gold per year (yearly market value: US\$ 40 million) and requiring an investment of US\$ 50 million, and mine live of 10 years.

- Development of the **Hajigak iron ore** deposits as well as other deposits in Baghlan and Bamiyan provinces could be envisaged. Given the existence of good quality coal resources around these deposits it is possible to conceive of an integrated ferrous metals industry, direct reduction of iron to produce steel products for local consumption, and/or (depending on transportation developments) export iron ore to middle east markets.
- Development of **large scale coal mines for production of electricity**. The government is currently planning to conduct, through funding of foreign partners, assessments of coal resources in the country. This is with a view to identifying the best coal deposits in terms of reserves and quality in order to site a possible power plant. A water resource assessment should be conducted in tandem with the coal assessment to identify water resources for the power plant. Using coal for power production could be a quicker option for the country than developing gas reserves.

### 3. ATTRACTING NEW INVESTMENT

#### WHAT INVESTORS WANT AND THE LESSONS OF MINING SECTOR REFORM

Countries have become acutely aware over the past fifteen years of the necessity of attracting domestic and international capital since the amounts of investment required to develop mineral deposits and the risks of failure are too large to be possible or justifiable from a public expenditure point of view. A survey of major international mining companies was conducted in 1991 under the auspices of the United Nations and the World Bank to determine the relative importance of certain criteria used by the companies to evaluate potential investment projects in emerging economies. It should be noted that these factors are of critical importance to domestic investors, too. In order of importance, these criteria are:

1. Good geological prospectivity, mining tradition and potential
2. Clear mining rights and title (mining legislation)
3. Attractive and competitive fiscal conditions (tax legislation)
4. Ownership and control of operations (mining legislation)
5. Political stability and transparency of governance (government institutions)
6. Availability of infrastructure

#### **Mining Reform Works: The Case of Argentina**

The new government of Argentina in 1991 announced an ambitious program of macro economic and sectoral reforms. A major effort was undertaken to reduce the presence of the State in all sectors of the economy, the currency was fixed to the US dollar to stop inflation, and various impediments to new investment were remedied. In the mining sector, which had been moribund for years despite highly prospective geology, ground held by federal government and provincial government corporations was opened to new private investment, the mining law was reformed, a new mining investment act with internationally competitive fiscal incentives was passed, a modern computerized mine title and registry system was introduced, geological information systems were up-graded to international standards, and other reforms were undertaken to develop the sector. The results have been very successful: between 1993 and 2000, Argentina mineral production has increased from US\$ 341 million to US\$ 1,310 million, annual expenditures in exploration are over US\$150 million and in capital expenditures US\$ 350 million. Finally, exports of minerals has increase ten fold from US\$78 million to US\$ 700 million: by value, minerals exports are greater than beef. **Mining reform works.**

Experience during the period 1987 to 2000 has demonstrated that if governments address these issues they can and do attract significant amounts of investment. Chile, Peru, Mexico, Argentina, Ghana, Mali, Mongolia, and Tanzania, to name just a few countries – have undertaken measures to strengthen their mining sectors. These measures generally



have involved up-dating the mineral policy and strategy, re-writing the mining legislation (particularly in respect of mining rights), up-dating the mining taxation regime, reinforcing government supervisory institutions, building greater capacity (including good governance) within the institutions to effectively carry out their tasks, and developing a reliable and comprehensive scientific database of the earth system. Though time frames vary by country, in general once the sector has been strengthened investor interest can pick up quickly. Exploration for mineral deposits takes time, as does the development phase of a project. However, in some cases, such as Argentina (see box) minerals production increased by five times during the period 1992 and 2001. Afghanistan has favorable geology for a number of minerals which could be developed by the private sector. If the overall enabling environment for investment (criteria 2 – 5 above) could be strengthened then there is every likelihood that the country could benefit, as other countries have, from increased investment and benefits from the sector.

#### Examples of How Mining Sector Reform Works in Other Countries

<b>MINING SECTOR REFORM “BEFORE AND AFTER” RESULTS IN SELECTED COUNTRIES</b>						
Country	Exploration Value US\$ Million		Production Value US\$ Million		Exports Value US\$ Million	
	Before	After	Before	After	Before	After
Argentina	<3	150	340	1,310	70	700
Chile	15	250	2,400	7,500	2,300	6,900
Peru	10	200	2,000	3,900	1,900	3,600
Tanzania	<1	35	53	350	53	350
Ghana	<1	N.A.	125	700	125	650
Mali	<1	30	<1	242	<1	230

Source: World Bank staff estimates

#### **ROLE OF INTERNATIONAL RISK CAPITAL**

The mining industry is one of the most complex and competitive industrial sectors in the world.<sup>4</sup> Depending on the commodity, the production chain usually consists of extraction of the raw mineral commodity, beneficiation and concentration of ores, smelting and refining of product, marketing and brokerage of commodities, and fabrication into end-use products. The industry, at all stages of the production chain, but especially at the exploration, extraction and processing stage, is highly competitive and growing more so every year. Of particular interest is the division of labor between the large “major” mining companies and the smaller, so-called “junior”, mining companies. Each have essential, but distinct roles, to play in finding developing mineral resources.

<sup>4</sup> A excellent baseline document on the international mining industry is “Finding Common Ground”, Mining and Metals and Sustainable Development project, IIED, 2002.

**Small companies explore, larger companies develop and operate mines.** This has clear implications for the mining legislation in Afghanistan (security of tenure, mining title registry, “first-come, first-served” principle, work commitments, rapid and transparent transfer of the mining title) as discussed later in this chapter. There also is the necessity for the government departments responsible for the mining sector to be able to respond rapidly to applications for exploration licenses.

**There is keen competition among companies to raise equity and risk finance.** The availability of funding for exploration is highly sensitive to international commodity prices, competition from other industries, perceptions of the country where the investment will take place, and the track record of the company soliciting the funding. The funds are also “time-bound”, that is, once having received funding the companies must use it for exploration reasonably quickly otherwise new funding will be difficult to mobilize. Higher gold prices has stimulated renewed interest in mining venture capital, thus Afghanistan could benefit from this renewed interest.

**Increasing pressures for greater social and environmental consciousness.** Companies are attempting to do better in this respect, though there is often a wide divergence between the expectations of the local community in terms of support for social infrastructure and the economic realities of what the company can afford to spend. In Afghanistan, it is important that the government prepare umbrella laws on environmental and social protection. In addition, sector and industry specific environmental regulations will need to be developed. Also, government departments responsible for enforcing the regulations need to have sufficient trained personnel and logistical means to ensure compliance.

**Government must be vigilant to ensure that companies comply with obligations.** Governments in other developing countries have sometimes been disappointed if private companies simply speculate with mining titles and do not honor their pledges to invest in exploration. In Afghanistan it is important that appropriate legislation and government monitoring capabilities be put into place to prevent such speculation in mining titles.

## **GEOLOGICAL EXPLORATION AND THE ROLE OF GEO-SCIENCE**

The previous section of this Note addressed the issue of mining reform and how this is necessary to attract and retain investment in the sector. The other essential element for investment is, of course, the basic geological prospectivity. In this respect, Afghanistan’s geology is highly prospective and the potential to discover new mineral deposits is excellent.

The country sits astride the collision zone of the Indo-Pakistan and Asian crustal plates which has given rise to the Himalayas. Systematic mineral exploration in Afghanistan by Soviet and Afghan geologists began in the 1960s and intensified in the 1970s. According to reports, these efforts have led to the identification of 21 metallogenetic zones containing 1,428 mineral deposits, occurrences and showings. These comprise a wide

range of substances including coal, oil, gas, copper, iron, lead, zinc, gold, salt, industrial minerals, and gemstones.

Of particular note are the Aynak copper and Hajigak iron deposits which were extensively explored by the Russian and Afghan geologists and for which reserve/resource evaluation reports have been prepared. The Hajigak deposit, is reportedly the largest undeveloped iron ore deposit in the Middle East. The Aynak copper deposit, located just south of Kabul in Loghar Province, is part of a long belt of stratabound copper occurrences that have been compared to the Zambian copper belt deposits because of the age and the lithologies of the host rocks.

#### **Successful Tendering of Solid Mineral Deposits: Possible for Aynak?**

The issue of whether to tender the Aynak copper deposit has been raised in Afghanistan. Tendering of solid mineral deposits has not generally been successful in those countries where it has been attempted. However, there are some examples of successful tenders. The Antamina copper-zinc deposit was successfully tendered by the government of Peru in 1996. The international tender required bidders to pay US\$ 20 million cash payment and conduct an exploration program of US\$ 13.5 million. The winning bidder had a two year option during which time the exploration program would take place and the reserves confirmed. At the end of the two year period the winning bidder could either confirm its bid, at which time the US\$ 20 million would be paid to the government, or walk away from the project. The US\$ 13.5 million commitment for new exploration was guaranteed by the company against a letter of credit. The property was awarded to the highest bid calculated according to a formula which took into account 100% of the up-front payment plus 30% of the investment commitment. A consortium of international mining companies won the bid and the mine, one of the largest polymetallic mines in the world, entered production in 2002 with a total investment of US\$ 2.2 billion. The principal lesson to be drawn from the Antamina experience is to provide for a phased approach which will allow the investing company sufficient time to confirm existing reserve estimates and prove up new reserves. It should also be noted that significant reforms to the Peruvian mining law and regulations had been taken shortly before the privatization program. This provided the investor companies with sufficient security of tenure to mobilize international financing for the venture. Finally, Peru has an established "track record" in the mining industry. Companies, thus, felt more at ease investing in a known mining country than might be the case with a country an unknown track record and mining tradition.

According to the metallogenetic zoning model defined by the Soviet and Afghan geologists, mineral distribution in Afghanistan shows: i) energy (coal, oil, gas) and evaporite minerals (salt, gypsum) occurring in the northern-central area; ii) base metals, consisting mainly of copper and lead, along with gem stones occurring in the eastern area; and iii) ferrous minerals such as iron, tin and tungsten occurring in the central area.

Minor amounts of other minerals such as lithium, boron, beryllium have been found associated with pegmatite zones in the gem stones zones in the eastern areas.

Geological mapping of Afghanistan was carried out between 1967 and 1971 by groups of German, Italian and mainly Soviet and Afghan geologists. The mapping was conducted at various scales and compiled into a map covering the whole country at a scale of 1:500,000. The value of this work could be greatly enhanced by the application of modern mapping techniques such as the use of satellite imagery to better define outcrop location, structure and eventually any mineral alteration features.

Mineral evaluation studies involving resource definition has been conducted by the Soviet and Afghan geologists on 110 deposits throughout Afghanistan. Work at these sites involved detailed geological mapping, geophysical and geo-chemical surveying along with direct resource evaluation by pitting, trenching and drilling where applicable. The results of this work can be found in individual reports accompanied by the necessary maps and listings at the AGS. While very detailed and complete the work requires a new evaluation using modern mineral resource evaluation technology. Once an initial prioritisation of the different sites according to various criteria has been made, the mineral evaluation studies would be greatly enhanced by applying mineral resource technology such as digital spatial analysis modelling of the geological, geophysical, geo-chemical and bore hole data.

One of the principal problems in Afghanistan is the probable loss of valuable data and maps over the years and, especially, during the civil war when the geological survey building was utterly destroyed. The staff of the geological survey have done a great service to the nation by salvaging and protecting much of the information and data in their homes. These have been returned and are presently being catalogued and put into proper cabinet storage. Once this done it will be possible to evaluate how much data is actually missing. The other problem is that most of the maps and reports are available only as single copies. To be able available for planning and for promotional purposes, the maps and reports should be brought to a format that will allow them to be reproduced and disseminated. For the maps the easiest solution is to capture them digitally so they can be used in modern GIS software programs. The reports, for the most part are in Russian and should, as a first step, be summarized and translated from Russian into English.

Both the British Geological Survey and the United States Geological Survey have approached their respective governments to fund basic geological cartography, geo-spatial mapping, and other rehabilitation work with the Afghanistan Geological Survey. A good start may be made on the organizational aspects of the data through the use of limited trust funds with appropriate expertise. This could, for example, on the one hand allow the initiation of a small scale program to train a limited number Afghan geologists in GIS data capture by digitizing the country-wide 1:500,000 geologic map and on the other initiate a project to summarize and translate the evaluation reports on the major mineral occurrences produced by the Russian and Afghan geologists. The importance of an extensive and accurate geological information database, in a format which is modern

and can be used with advanced technologies, cannot be overstated. This is explained in the next section.

### **WHY IS GEO-SCIENCE IMPORTANT?**

Why do governments spend scarce public funds on geological cartography and earth science mapping? Are such activities really essential to overall economic development? Is geological mapping an activity which is better undertaken at less risk by the private sector? The answer in most countries is that an understanding of the geology and mineral potential in the national territory is indeed an essential pre-requisite for the rational development of these resources and economic development. But, there is an optimum division of responsibilities for conducting such research. The public sector concentrates on regional or thematic mapping while private mining companies concentrate on detailed exploration and evaluation of ore-bodies.

The main objective for geological mapping funded by the government is to achieve an understanding for the geology and resources of a region. This understanding is useful for a number of applications. Geological maps are an essential set of data which, when integrated into a GIS system (geographical information system), can be an essential tool for land use planning and for communities to decide on the rational use of valuable resources. The maps are also used to identify environmentally sensitive and bio-diversity zones, for investigation of water resources, and for detection of areas susceptible to seismic events. They are useful to identify industrial and construction materials important to society, such as clay for bricks, limestone for cement, salt for domestic and industrial consumption. And, of course, the regional and thematic geological maps produced by the government help orient the detailed exploration by private companies for metallic and non-metallic minerals and thereby lessen the risk and cost of this exploration to the company.

Geological maps prepared with government funds present in a visual form different types of scientific data. Maps made from satellite photography and images allow not only coverage of large areas but also real-time analysis of data. Geophysical information collected by aircraft flown at low altitude with sophisticated sensing instruments show main tectonic and structural features which information is important to find deposits under the surface. Thematic maps depict regional geology and the distribution of elements which are important for prospecting for mineral deposits. Geology, like any science, is a rapidly evolving discipline. Geology maps tend to reflect the geological thinking and the theories in use at the time when they were produced. It is thus important that the government funded geological surveys make use of the appropriate technologies and methodologies.

The quality standards and coverage of geological maps varies from one country to the next depending on the resources and time allocated to the task. Developed countries are often mapped in great detail and quality, at a scale of 1:50,000 or 1:25,000 covering the whole country. This level of detailed coverage is neither feasible nor cost effective in most developing countries. In these countries regional geological maps are produced in

1:100,000 or 1:200,000 scale and then compiled into larger scale maps covering whole country. It has become more frequent that governments fund thematic regional surveys in order to attract the interest of international mining companies. In Australia, for instance, the government of New South Wales undertook a large scale geophysical survey which resulted in the discovery and development by private companies of at least two new mineral deposits. An important factor in the government's ability to attract private sector investment is to make the maps available to interested parties at nominal cost<sup>5</sup>. The maps should be available in digital form, on CD-ROM or available through the internet. In many countries the geological maps are mostly available in paper copies only, which greatly reduce their accessibility and utility to the companies. Also, promotion of the geological knowledge at international conferences and industry meetings (PDAC in Canada, Mining 2003 in Australia) is important. In this context it is important that the future users of the geological data can obtain them easily and for a comparatively low price.

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<sup>5</sup> A normal practice in many countries is to sell CD-ROMs with the relevant data for a nominal price. The price for the CD-ROM only covers the shipment and not the collection of data, digitization and production of the CD-ROM.

## **4. LEGISLATIVE AND REGULATORY ENVIRONMENT**

The government has stated as a policy matter that it intends to promote private investment in the mining sector as a means of achieving sustainable growth. Experience in other countries demonstrates that attracting and retaining private investment in the mining sector depends not only on the geological prospectivity of the country, but also on the laws, regulations, and taxation (enabling environment) that pertain to such investments. The Ministry of Mines and Industries is currently preparing a new Minerals Law and Regulations. While each country's mining law will have unique features, the experience of many other countries provides evidence that certain common practices and principles can stimulate new investment and help ensure that investment in the mining sector achieves the maximum development impact.

### **SUCCESSFUL LEGAL AND REGULATORY REGIMES IN MINING**

This experience suggests that key elements of a successful mining legal and regulatory regime for Afghanistan include the following.

#### **State ownership of all minerals resources existing in their natural state**

Prior to the adoption of the new constitution, it was unclear who owns minerals existing in their natural state. However, the new constitution removes this uncertainty by clearly indicating that minerals in their natural state are the property of the State, and that the Government is the custodian of these resources on behalf of current and future generations.

#### **A clear legal basis for private access to mineral rights**

In the absence of a proper minerals law, it is unclear whether a private party may legally explore for and exploit minerals and whether a private party may sell the minerals it produces. This uncertainty, together with the overall difficulties of the central government to establish its authority, has led to an increase of “unofficial” private mineral activity. The new minerals law will clearly establish that private parties may undertake minerals exploration and exploitation in Afghanistan. In almost every country, the Mining Law establishes that all private investors may obtain the right to conduct exploration and exploitation of minerals (including the right to own and sell extracted minerals). In Afghanistan, the Constitution and Minerals Law will confirm: 1) the right of private parties to obtain mineral rights from the State; 2) that mineral rights obtained from the State are property rights protected under the Constitution from expropriation without fair compensation; and 3) provide the authority for the State to enter into commercial contracts with private parties with respect to mining rights.

### **Clear identification and mandate of the Government institution with the power to grant private access to mineral rights**

Existing State Owned Enterprises as well as private mine operators will need to know which government agency has the power to grant mineral rights. The Mining Law should clearly designate the government agency with the power to regulate the mining sector, and the power to grant private parties with access to mineral rights. At the present time, the appropriate government agency would appear to be the Ministry of Mines and Industries. If there are any other ministries that may share regulatory authority over some aspects of mining activity (such as the Ministry of Finance (tax), Ministry of Environmental Protection (environmental protection), Ministry of Work and Social Affairs (employee health and safety) or Ministry of Commerce (foreign investment, sales and exports)), then their respective responsibilities should be clearly defined in the Mining Law.

### **The State should act as regulator of private sector mining activity rather than as explorer, operator or equity-owner**

Currently, the mining sector of Afghanistan is characterized by State ownership and operation of mines. It is acknowledged, however, that efficient operation of these State mining enterprises as well as future growth in the mining sector in Afghanistan will depend primarily on the mobilization of investment from the private sector (both domestic and foreign). Internationally, over the past 20 years there has been a distinct trend for the State to divest its equity ownership of mining operations, desist from operating mines, and to clearly distinguish regulatory from operating functions. Substantial evidence suggests that private operators are, on the whole, more efficient than traditional state operators in the exploration or exploitation of mines. When the State participates in mining activities as both an owner/operator of mines and a regulator of private mining activity, conflicts of interest arise which can both discourage private investors (who may be concerned about preferential treatment for competing state enterprises), and prevent the State from properly exercising its regulatory functions. The Mining Law should reflect a general policy orientation favoring private operation of mining activities (for example, it should not contain mandatory requirements of government participation in ownership).

It must be recognized, however, that a significant portion of mining activity within Afghanistan is (and on the date of enactment of the Mining Law, will be) conducted by the State. When the Mining Law is enacted, these state mining enterprises will also need to be regulated (presumably by the Ministry of Mines and Industries). To the extent possible, the Mining Law should: (a) ensure that the State enterprises be subject to the same rules as private investors, and (b) provide means to enable the transfer of such State enterprises to private ownership and operation in the future.



## **Mining Cadastre**

Establishment of a Mining Cadastre and other necessary institutions within (or outside) the Ministry of Mines and Industries is necessary for promoting, implementing and regulating private sector mining development. The current organizational structure of the Ministry of Mines and Industries does not include certain departments or institutions needed to promote, implement and regulate private investments in the mining sector, such as a modern Mining Cadastre responsible for the recording, granting and cancellation of mineral rights and for making such records available to the public.

In addition, other institutions that may or will be needed include a Mining Inspectorate, capable of monitoring and enforcing obligations of mineral rights-holders. A legal department within the Ministry is also required to provide legal advice and to assist in negotiations, if applicable, with potential investors. Also, it may be necessary to establish one or more State holding companies to hold the State's portfolio of shares in any mining enterprises or mining joint venture interests, if any. In many other countries, these State portfolio holding companies are domiciled in the Ministry of Finance. The Mining Law should create these institutions, clearly authorize them to perform their respective functions, and determine how they will be funded.

## **Granting of Mineral Rights**

Clear identification of the form and nature of mineral rights must be made available to the private sector, including their basic terms, and the procedures and criteria for granting such rights. Prospective private investors require a clear understanding of both the substantive rights and obligations that attach to a mineral right, and the procedural requirements for obtaining a mineral right. A mining law that effectively sets out the rules, terms and conditions regarding mining rights can encourage private investment by making these issues clear. In the absence of a mining law which sets out the basic terms and procedures applicable to mineral rights a prospective investment would have to be negotiated on a case-by-case basis.

Experience in other countries has shown that case-by-case negotiation of the terms and conditions of individual mining investments presents an enormous administrative burden to the State, and it also results in uncertainty and unfairness, because each deal is different. These problems can be reduced through the Mining Law and related regulations which clearly set out the procedural rules, and general terms and conditions of mineral rights applicable to all mining investors, whether domestic or foreign, and whether a private entity or a state entity.

Examples of uniform terms and conditions of mining rights that are widely adopted in other countries include: (i) "first-come, first-served" priority right to exploration rights; (ii) submission by the prospective investor of a work program and expenditure obligations; (iii) relinquishment of surface area after a certain time or upon abandonment of the mining title; (iv) time limits imposed on the Mining Cadastre to process mining

title applications; and (v) clear, consistent, and transparent rules of procedure mining title issuance.

There may be an extremely small number of special mining projects (for example projects of national political significance), for which exceptions to the general rules may be justified or necessary. In such cases, the Mining Law may include a provision authorizing the Cabinet of Ministers to enact special exemptions to the general provisions of the Mining Law by decree in highly unusual circumstances.

### **Transparent Fiscal and Tax Packages**

From the investor's perspective, the fiscal and taxation terms applicable to the mineral activity are among the most important terms and conditions. In general, mining operations should be subject to overall taxation and regulations, as for any commercial activity. However, there may be special circumstances where mining activities could be eligible for different tax treatment than activities in other sectors, particularly with respect to mineral royalties, accelerated depreciation allowances, loss carry-forwards and exemptions from customs duties on imported equipment. However, for the same reasons discussed in paragraph (f) above, the tax treatment of mineral investors should be clearly stated in law (whether in the Mining Law or in the general tax law) and consistently applied, so that the tax treatment of mining investors can be readily ascertained by an investor, and that case-by-case negotiations of tax rates for individual mining investments are discouraged. To the extent that the Mining Law includes special taxes or charges (such as royalties), or exceptions to general tax laws, for mining activities or mining investors, the Mining Law should clearly state the relationship of such provisions to the general tax laws, and authorize the Ministry of Mines and Industries and/or the Ministry of Finance to implement such taxes or charges.

### **Security of Tenure**

Security of tenure, which refers to the assurance that an exploration license-holder may obtain an exploitation license if it makes a discovery, consistently ranks as one of the most important investment considerations in surveys of mining investors. Legal regimes which provide for an automatic right to develop a deposit in the event of a commercial discovery tend to attract more private investment (and particularly more exploration investment) in the mining sector than those which do not provide for security of tenure. The Mining Law should provide holders of an exploration right with a high degree of assurance that they will be entitled automatically to exploit any discoveries, subject to the implementation of appropriate environmental safeguards.

### **Transferability of title**

Because of the high up-front costs involved in mining activity, mining investors in particular are concerned with whether the mining right can be easily transferred or pledged/mortgaged to a third party. This is especially important since many times a small company will begin investment or exploration and later seek to transfer the mining

title to a larger company with the financial strength to develop the deposit. Also, mining investors will often seek to borrow from third parties to finance exploration and development, and it will be essential to the investor to know that the mining right can be pledged or mortgaged to third-parties as security for exploration or development financing. The legal regime can promote mining investment by allowing mining rights to be easily transferred, pledged and/or mortgaged, either without the consent of the State, or upon the satisfaction of clearly stated and objective conditions that do not require the exercise of ministerial discretion.

### **Other Investor Rights**

The legal system can further promote private investment in the mineral sector by providing for other assurances typically sought by private investors generally, such as: 1) guarantees of “stability” of economic terms of the mining right (including taxes and other payments to the State); 2) guarantees of the right to compensation for expropriation of the investment (or for breach by the government of the terms of the mineral right); 3) the right to sell production abroad; 4) the right to keep and repatriate earnings and profits (after payment of taxes); 5) the right to acquire foreign exchange or to maintain hard currency bank accounts domiciled within Afghanistan or, with approval of the Ministry of Finance, outside of the country; 6) the possibility of entering into investment agreements with the State governed by the laws of a neutral jurisdiction (e.g., in another country; and, 7) the availability of international arbitration (or some other acceptable method of dispute resolution) to resolve disputes between the investor and the State. Since mining activities are excluded from the scope of the Law of Afghanistan on Private Investment (the general law regarding incentives for private investment), it could be appropriate for the Mining Law to include some or all of these rights within the terms of the Mining Law itself.

### **Appropriate environmental, health and safety requirements**

Clarity in regulation of environmental protection and worker health and safety are of great importance in the mining sphere, not only for Afghanistan to maintain its ecological heritage and social tranquility, but also to provide security and guidance to potential investors. We have been unable to determine whether Afghanistan has an umbrella environmental law, but we understand that existing environmental, health and safety laws adequate for the specific requirements of the mining sector do not currently exist in Afghanistan. Additionally, the government agencies currently responsible for implementing and monitoring compliance with environmental and worker health and safety laws lack the trained manpower and practical means to adequately implement and enforce these laws for the mining sector. The Mining Law can address these concerns both by including the relevant requirements for environmental protection and worker health and safety within the terms of the Mining Law itself, and by establishing an environmental, health and safety unit of the Ministry of Mines and Industries, which would be responsible for regulating and monitoring compliance specifically for the mining sector.

## **Regulation of Construction Materials**

Many countries provide simple regulation for the extraction of ordinary construction materials such as sand and gravel. In Afghanistan, much of this activity occurs on a small scale or on an “unofficial” basis, and some of the general requirements of the Mining Law (such as the submission of feasibility studies and work plans) may be too burdensome. It may therefore be appropriate for the Mining Law to permit the possibility of simpler regulation for the extraction of ordinary construction materials.

## **Special regulation of small-scale mining**

Small-scale mining constitutes an important portion of Afghanistan's mining sector, which presents a host of legal, fiscal, environmental and social issues that are unique to small scale mining. Small scale mining appears to occupy a significant portion of the workforce employed in the mining sector, but much of the sector operates “unofficially” or even illegally. Special treatment of small-scale activity may be appropriate in the Mining Law, in order to provide the Ministry of Mines and Industries the flexibility to address issues unique to the regulation of the small-scale mining sphere (which may, for example, require technical, financial and marketing assistance), to provide relief from general requirements of the Mining Law that may be too burdensome and to otherwise encourage the incorporation of small-scale mining into the “official” economy.

## 5. MINING TAXATION AND FISCAL CONDITIONS

*"The art of taxation consists in plucking the maximum amount of feathers from the goose with the least possible hissing".*  
- Jean-Baptiste Colbert, Finance Minister to Louis XIV

### CURRENT STATUS OF TAX AND ROYALTY LAWS

A discussion on mining taxation should distinguish between generally applicable taxes for all sectors and those taxes which may be particular for the mining sector. This is all the more pertinent in the case of Afghanistan, where the general tax laws are in a state of development.

Concerning general taxation, the Ministry of Finance has embarked on a methodical reform of tax legislation with a view to enact tax laws that will provide a fast and meaningful return to the government. Consequently, the Ministry has enacted a new customs law which provides for three or four rate categories (including a zero rate category), and provisions for duty exemption for temporary importation and duty remission for capital equipment on a case-by-case basis. In addition, the Ministry is preparing legislation that may focus on impose income tax on large taxpayers (namely, expatriate individuals) and on the introduction of a withholding tax on rental payments. The Ministry proposes to introduce new taxes in stages. For example, the introduction of value added tax (VAT) legislation is not a priority, and is considered to be about five years away from implementation.

Many of these taxes will be packaged as reforms to the existing basic tax law of 1964. While far from an ideal solution, amending the 1964 law does have the advantage of quickly establishing certain key taxes. Based on discussions with Ministry of Finance officials and their external advisors, it is understood that the Ministry is considering corporate profits tax legislation that would include: a 20% tax rate; accelerated depreciation; and unlimited carry over of losses. The legislation would not include tax holidays. It is important that the Ministry of Finance move quickly to establish the basic taxation regime for industrial and other activities in Afghanistan. Not only is this required to tap into potential revenue sources but also because potential investors will need to know beforehand the tax treatment to be applied to their investments.

The draft Minerals Law defers to the generally applicable tax legislation and does not define a specific or separate taxation regime for mining. This is consistent with international best practice which is to avoid special treatment for specific sectors. However, the Minerals Law does make reference to certain allowances and adjustments to the general taxation regime, as may be agreed to by the Ministry of Finance upon suggestion of the Ministry of Mines and Industries. In addition, in accordance with practices in nearly every country, it is proposed that a schedule of royalties and fees be annexed to the Minerals Law and an integral part of it. Royalties and fees in respect of mining titles are generally part of the minerals legislation and administered by the government agency directly responsible for the mining sector. This is because of the technical nature of the assessments and the requirements for trained personnel with proper scientific equipment to verify the quality, quantity, and purity of the mineral commodities subject to royalty calculations. The Ministry of Mines and Industries and the Ministry of Finance are currently discussing arrangements for responsibility for royalties. The proposed Minerals Law clearly specifies that all taxes and royalties should be paid directly to the central government treasury.

Because Afghanistan's basic taxation system is currently being developed, we include below an explanation of international best practice and standards for minerals taxation.

#### **DESIGNING A MINING TAX REGIME THAT WILL ATTRACT INVESTMENT**

A typical mine in most mining countries is subject to a wide range of taxes, including:

- Corporate profits (income) tax;
- Royalty;
- Customs duty;
- Turnover tax (for example, VAT or Goods and Services Tax (GST));
- Payroll taxes (for example, social insurance and pension premiums);
- Licensing and permitting fees;
- Land taxes;
- Water taxes; and
- Business taxes.

It is important that all taxes be taken into account in designing an attractive mining tax regime. In assessing the effect of the taxation regime on a potential investment, the prospective investor will consider the total tax burden and its impact on the profitability of the project. For example, Table 1 shows four different tax regimes that allow the investor to realize the same rate of return<sup>6</sup>. Changing just one of the three taxes shown in the Table can have a significant effect on the attractiveness of the project. For example, if

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<sup>6</sup> "Rate of return" is the most commonly used measurement of the economic feasibility of a mining project. Generally, an investor in a mining project would demand a minimum rate of return in the 15% to 20% range, depending on a number of factors including country risk. Afghanistan's country risk is such that an investor in the mining sector would insist on a rate of return at the upper end of this range.

the customs duty in Case A was increased from 5% to 15%, the project’s rate of return would drop to 15.8%, and the investor may decide not to invest in the project.

Table 1 – Comparative mining tax regimes

	Case A	Case B	Case C	Case D
Profits tax rate	20%	25%	20%	25%
Royalty	2% gross	2% gross	3% NSR	1% gross
Customs duty	5%	0%	5%	5%
Rate of return	16.9%	16.9%	17.0%	17.0%
Government share of pre-tax cash flow	29.0%	32.3%	28.2%	29.9%

A modern tax regime should seek to meet the following objectives:

- Provide for a fair participation by government and investors;
- Be stable over time;
- Be transparent, and provide a level playing field for all investors;
- Be easy to understand;
- Be easy to administer; and
- Be internationally competitive.

The provisions of an attractive mining tax regime should recognize the unique features of the mining sector. The following characteristics of the mining sector distinguish this sector from other industrial sectors.

### **High Risk**

Relative to most other industries, the mining industry is characterised by high risk. This risk is present at all stages of the project’s life cycle, including the exploration, development, and production stages.

### **Capital Intensive**

The mining industry is capital intensive. Substantial amounts must be spent annually on exploration to discover sufficient ore to replace the ore that is currently consumed. Today, a world class base metal mine can typically cost in the range of US\$2 billion to bring into production.

### **Price-Taker**

The prices of most mineral products are established by the interaction of supply and demand in the global marketplace. The mining enterprise does not set the price for its product – the enterprise is a “price-taker”. Because the mining enterprise is a price-taker,

the enterprise's tax burden cannot be passed onto the enterprise's customer – the mining enterprise must bear the burden of taxes imposed on its activities and products.

### **Mining Profits Are Cyclical**

Most metal prices show wide swings over the years, and the typical mining enterprise's profits will reflect these price cycles. It is common for even the largest mining companies to record losses for a number of consecutive years as a result of soft metal prices.

### **Remote Locations**

Invariably, ore bodies are found in remote locations. Consequently, in most instances the mining project involves substantial infrastructure costs.

### **Finite Life**

Unlike a manufacturing plant or a service business, a mining project has a finite life, because its mineral reserves are finite. This means that the enterprise has a limited number of years over which to realise a competitive rate of return on its investment.

The feasibility study, on which the project investment decision is made, takes into account the entire life of the project, and must assume that the tax regime will not change significantly during the project's life. A change to the tax rules part way through the life of the project could jeopardise the viability of the project and result in it being shut down.

### **Restoration and Reclamation**

There is a trend in the regulatory climate to charge the mining enterprise with stricter responsibilities for site restoration and reclamation, and mine closure.

### **State Ownership Of The Mineral Resource**

In many jurisdictions, the mining enterprise is obligated to make some form of royalty payment to the government as a consequence of the government's ownership of the resource. This royalty can represent a significant component of the enterprise's total tax burden.

Afghanistan's mining tax regime should also reflect the characteristics of the country's mining sector – namely:

- Gem stone production and export represents a potential source of tax revenues that will require particular administrative and collection procedures;
- Industrial minerals are sold largely into the domestic market; and
- There is geological potential for world class base metal projects, but no such projects exist at present.



## Royalties

Basically, four different kinds of royalty are found in the global mining sector:

1. Gross production royalty;
2. Gross revenue royalty;
3. Net smelter return (NSR) royalty; and
4. Net profits royalty.

A gross production royalty is calculated by multiplying the number of units of production (for example, tonnes, grammes, etc.) by the royalty rate. (See Table 2.) This kind of royalty is frequently used in the industrial minerals sector, and sometimes in the coal sector.

Table 2 – Gross Production Royalty (Illustration)

Tonnes produced	100,000
Royalty rate per tonne	\$35
Royalty payable	\$3,500,000

A gross revenue royalty is expressed as a percentage of the gross value of production.<sup>7</sup> (See Table 3.) This kind of royalty is probably the most common type of royalty, and is commonly applied to precious stone production, precious metal production, base metal production, and coal production.

Table 3 – Gross Revenue Royalty (Illustration)

Tonnes produced	100,000
Price per tonne	\$2,000
Gross revenue	\$200,000,000
Royalty rate	2%
Royalty payable	\$4,000,000

The term “net smelter return” is a term that is commonly used in the global mining sector to mean the gross value of production, minus realization costs (refining and smelting costs, transportation costs, and marketing costs). (See Table 4.) NSR royalties are less common than gross royalties.

Table 4 – Net Smelter Return (NSR) Royalty (Illustration)

Gross revenue	\$200,000,000
Realization costs	50,000,000
Net smelter return	\$150,000,000
Royalty rate	3%
Royalty payable	\$4,500,000

<sup>7</sup> A gross revenue royalty is sometimes called an *ad valorem* royalty.

A net profit royalty is expressed as a percentage of the net profit derived from the mine. (See Table 5.) Net profit royalties are probably the least common kind of royalties, although most of Canada's provinces impose net profit royalties.

Net smelter return	\$150,000,000
Operating costs	100,000,000
Net profit	\$50,000,000
Royalty rate	10%
Royalty payable	\$5,000,000

It is important to note that the government's risk is different in the case of each of these four different kinds of royalties. The government has the lowest risk in the case of the gross production royalty, because the government will collect the same amount of royalty regardless of fluctuations in product prices, operating and capital costs, and profitability. The government's risk is highest in the case of a net profits royalty, because changes to all of these variables will impact the amount of royalty collected by the government. Royalty rates reflect these varying risks, with gross royalty rates being relatively low, and net profit royalty rates being relatively high.

#### INTERNATIONAL STANDARDS AND BEST PRACTICES

To ensure that Afghanistan's mining sector realizes its potential as a source of growth for the country, the mining tax regime should incorporate international standards and best practices.

Table 6 summarizes important tax provisions in eleven countries. The first eight countries are developing countries that are actively trying to encourage investment in their respective mining sectors. The last three countries have mature, robust mining sectors.

Table 6 – Comparative Summary of Key Tax Provisions

Country	Income tax			Royalty	Customs
	Rate	Depreciation	Loss carry forward	Rate	Rate
China	30%	10%	5 years	0.5% - 4.0% gross	0%
Indonesia	30%	10% - 100%	8 years	Various	0%
Laos	20%	16.7%	8 years	2.5% - 5.0% gross	
Mongolia	40%	5% - 10%	5 years	2.5% gross	0% - 5.0%
Pakistan	35%	25% - 100%		See Table 7	5.0%
Peru	30%	20%	4 years	0%	0%
PNG	35%	10%	7 years	2% NSR	0%
Vietnam	25%	2% - 20%	5 years	1% - 8%	

Australia	30%	10%	Indefinite	Various	5%
Canada	40%	100%	7 years <sup>8</sup>	10% net profits	0.5%
U.S.A.	35%	15%	20 years <sup>9</sup>	2.25% gross	Various

Table 7 sets out in more detail the royalty rates in Pakistan.

Table 7 – Selected Royalty Rates – Pakistan

Mineral	Royalty
Precious stones	10% gross
Semi-precious stones	2% gross
Precious metals	2% gross
Base metals	2% gross
Coal	\$1/tonne
Gravel	\$.10/tonne

In the context of seeking to attract both domestic and foreign investment to its mining sector, Afghanistan's key tax rates should be at the more generous end of the range of rates in Table 6. For example, the collective set of rates shown in Case A in Table 1 would represent a good starting point for consideration.

#### TAX ADMINISTRATION AND COLLECTION

The administration and collection of taxes, other than royalties, mineral license fees and similar payments, will fall under the umbrella of the Ministry of Finance. It is understood that the Ministry of Finance is being advised by internal and external consultants with respect to this matter.

The administration and collection of royalties, mineral license fees, and similar mineral-related payments should be the responsibility of the Ministry of Mines and Industries. This Ministry's priority should be to establish a system that will focus on the collection of royalties on industrial mineral production, and base metal and precious metal production. Gem stone production is deeply entrenched in the informal sector, and needs significant institution building before the collection of royalties can be seriously considered.

All funds collected from taxes and royalties should be deposited to the central treasury. The Minerals Law contains specific clauses to this effect.

<sup>8</sup> Losses can also be carried back to the three preceding years.

<sup>9</sup> Losses can also be carried back to the three preceding years.

## Stability

As indicated above, it is important that a mining tax regime be stable. The investor's decision to proceed with a project is largely based on a bankable feasibility study. The feasibility study is based on some important assumptions regarding metal prices, production levels and ore grade, operating costs, taxes, and other important variables. Once the project is up and running, the continued viability of the project is a function of these variables. If the variation of taxes over project life can be minimized - that is, if the tax regime is stable - then there is one less variable or risk to threaten the enterprise. One risk factor is either reduced or eliminated.

A number of countries have adopted tax stabilization mechanisms, including Argentina, Chile, Indonesia, Kazakhstan, Laos, Mongolia, Peru, and Uzbekistan. By reducing the risk of the mining project, a tax stability agreement can help to reduce the financing cost of the project, thereby making the project more economically viable. Tax stabilization mechanisms are particularly helpful in the case of a country that does not have a track record of legislative stability, such as Afghanistan.

Stability can be delivered in a number of ways, but the most common means of providing stability is through a bi-lateral agreement between the government and the mining enterprise. This agreement should have a foundation in law, and should not violate any existing laws.

The coverage of stability agreements varies among countries. For example, a stability agreement can:

1. Freeze tax rates only, but not the basis (rules) for taxation. For example, Mongolia's standard stability agreement fixes the corporate income tax rate at 40%, but does not hold constant the rules for determining taxable income; or
2. Freeze both the tax rates and the basis for taxation (as in Indonesia's Contract of Work); and/or
3. Protect the taxpayer from new taxes that are introduced after entering into the stability agreement; and/or
4. Allow the taxpayer to avail itself of beneficial tax changes that occur subsequent to the effective date of the agreement.

There is stronger support for Alternatives 2 and 3 as compared to Alternative 1, on the basis that the main purpose of a stability agreement is to prevent the taxpayer's tax burden from increasing as a result of future changes to the law. An argument in favour of Alternative 4 is that a beneficial tax change may be necessary in order to keep the country's tax regime internationally competitive, and that existing taxpayers with stability agreements may need to benefit from such changes in order to remain competitive. Arguments against Alternative 4 include:

- The investment decision to bring a mine into production is based on the tax regime that is fixed by the stability agreement. If a taxpayer benefited from a favourable change to a tax law, that benefit could be viewed as an unnecessary "windfall"; and
- Being denied the benefits of future favourable tax changes is part of the "price" paid by the taxpayer for being able to enjoy the benefits of the stability agreement.

## **Government Equity Participation**

Historically, a number of countries have mandated government participation in a mining project, either directly through a joint venture or indirectly through a shareholding in a mining company. In some cases, the government does not pay for its equity interest, while in other cases the government pays for its interest.

In the global mining arena, there is a trend away from government participation in mining enterprises. There are various reasons for this trend, including:

- Where the government does not pay fair value for its interest, the mining company's return on investment is adversely affected;
- Where the company pays fair value for its interest, it is usually using scarce financial resources that can be better used in more traditional government functions such as education, healthcare, and so forth;
- Government equity participation in a mining project is a relatively high risk way of participating in the project, as compared to the collection of royalty or profit tax;
- Experience shows that, where the government subsequently decides to divest itself of its interest, the process of divestment can be complex, time consuming, and costly;
- Investors tend to prefer to invest in mining projects where the government is not a co-participant. Investors find that government participation slows down the decision-making process at the enterprise level, and discourages other investors from investing in the project; and
- There are few, if any, good reasons for government to participate in this way in a mining project. There are better ways whereby the government can participate in, and have input to, a mining project – namely, through mining regulations and tax legislation.

For these reasons, the Government of Afghanistan should avoid the temptation to take equity interests in mining projects through joint ventures or shareholdings.

## **Tax Exemptions**

Over the years, other countries have included “exempt periods” in their tax legislation. The advantages of such exempt periods include:

- The exempt period can compensate for relatively high tax rates; and
- Providing for an exempt period can send a strong signal to the investment community that the host country is “pro mining”.

The disadvantages of an exempt period include:

- The mining company may be tempted to “high grade” its operations – i.e. mine its high grade ore during the exempt period, so as to maximize the amount of profit realized during the exempt period instead of during taxable periods; and
- The existence of an exempt period in legislation complicates the administration of, and compliance with, the legislation. Taxpayers are known to take aggressive tax filing positions in order to maximize taxable profits during the exempt period.

A tax regime that provides for a relatively high tax rate, together with an exempt period, is sometimes referred to as a “take-it-away, give-it-back” regime. The current global trend in tax policy is away from such regimes, and towards a tax regime that is simpler and has lower tax rates.

In 1972, Canada replaced its three-year exempt period with accelerated depreciation. Under Canada’s accelerated depreciation rules, all capital expenditures incurred prior to the start of commercial production are 100% deductible in any year in computing taxable profits. Accelerated depreciation can serve the same purpose as an exempt period – namely, to allow the taxpayer to achieve fast payback<sup>10</sup> of capital invested.

#### **KEY ELEMENTS FOR A MINING TAXATION REGIME**

1. Keep the tax legislation simple, clear, and stable;
2. Ensure that the legislation is competitive by incorporating international standards and best practices;
3. Ensure that the Ministry of Finance and the Ministry of Mines and Industries share their knowledge where tax provisions affect the mining sector;
4. Focus on establishing a collection and administration system for royalties on current and near-term production – namely, industrial minerals, coal, and base metals;
5. Use accelerated depreciation in the income tax law instead of tax exemptions;
6. Recognize that the mining industry is a capital intensive interest, and that customs duties paid on the importation of capital goods cannot be passed by the mining enterprise to its customers. Customs duties should be kept to a minimum, and
7. Avoid equity participation in mining enterprises

<sup>10</sup> One of the important criteria considered by lenders and other investors is “payback”. A lender, for example, will want to minimize its exposure to project risk by being repaid as quickly as possible.

## 6. INSTITUTIONAL ARRANGEMENTS

### BACKGROUND

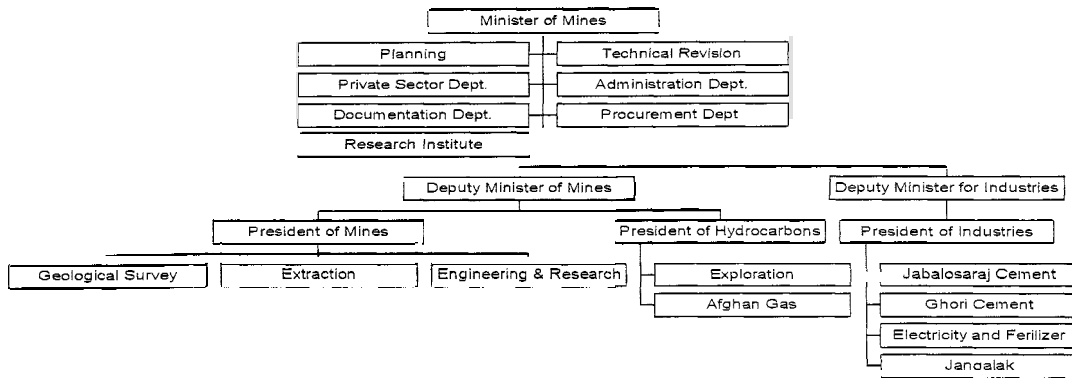
With the political events of the past 20 years and the difficulties of the civil war, it is understandable that the Ministry of Mines and Industries (MMI) is facing severe difficulties to re-establish its authority over the mining sector. A number of problems most, hopefully, of a transitory nature, are noted in this respect. The buildings of the MMI have been thoroughly looted of most equipment and there is little left for staff to work with. Presently, a few offices are being rehabilitated to accommodate senior officials and some staff. Selected rooms have also been reconditioned for specific use such as computer and language training. But, most staff still lack the proper implements and equipment to do their jobs. The MMI also has little capability, either physical or financial, to collect data on minerals production, imports, exports, marketing conditions, and producers. There is sometimes a dis-connect between the "plan" and the "actual" figures reported. The MMI faces even more severe difficulties at the provincial level. Finally, while MMI staff are dedicated and, for the most part, well trained, they have been isolated for scientific and other developments in the international industry for over 20 years. Two examples of this isolation: the last geological expedition took place in the mid-1980s and no new investment has been made in the coal production mines at Pul-i-Kumir since 1988. In spite of these handicaps, given time and sufficient funding, these logistical and staff problems can be overcome.

A more fundamental problem relates to the mandate and organization of the Ministry. The MMI and the Afghanistan Geological Survey (AGS) are still organized to follow the "command-and-control" model of the former Soviet Union. This model is out-of-date and fundamentally incompatible with the new emphasis on private sector investment. There are a number of difficulties observed in the present mandates and organization of the Ministry. First, it is still organized into production units and departments which are directly involved in the exploitation of natural resources. For instance, the AGS explores for deposits and, once proven, turns them over to a production unit within the MMI. In future, the central government will not have the funds available to provide these production departments with investments required to develop and operate mines. Second, attracting private sector for solid mineral developments will be difficult if the new private companies were required to compete or enter into associations with the Ministry's own production units. There will always be the presumption of preference given by the Ministry to its own production units, to the detriment of the private sector. Third, consistent with the overall policy objective of fostering private sector investment, there is an intention to create proper regulatory function within the Ministry. However, this will automatically pose a conflict of interest since the Ministry will, on the one hand

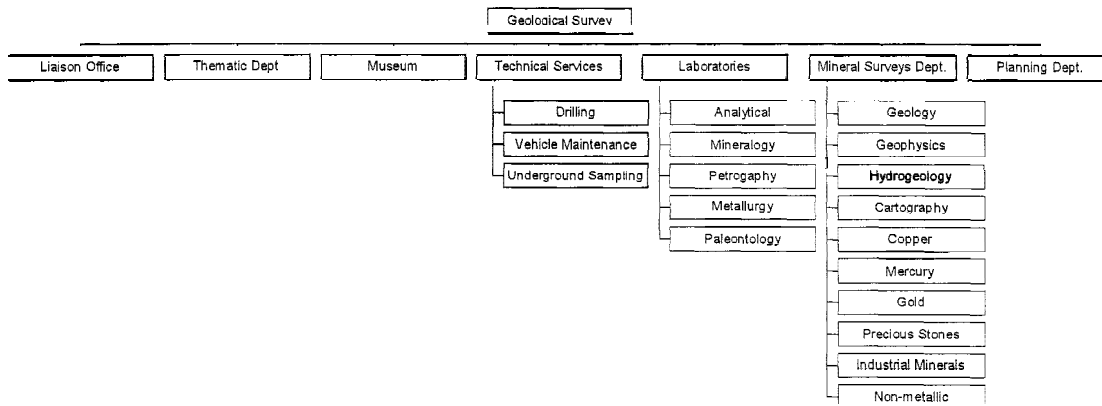
be an owner/producer of minerals and, on the other, a regulator of private companies in the sector. The Ministry may also face an issue of credibility when called upon to adjudicate disputes between, for instance surface and subsurface land owners, local communities and private companies, or private companies and state owned enterprises.

The current organization of the MMI and the AGS are presented schematically below.

### Ministry of Mines and Industries



### Afghanistan Geological Survey



Other countries have faced similar challenges to Afghanistan to organize and mandate their central ministries responsible for mining. While each country organizes the institutions differently, most are organized for the regulatory function, not to own or operate mines, as is presently the case in Afghanistan. These countries have a central Ministry or Agency responsible for the sector. By legislation it is designated to serve as the Government's principal contact for all mineral sector related activities. It provides policy advice to the Government, and coordinates with all other governmental institutions and political structures. In Afghanistan, the Ministry of Mines and Industries is the central Agency responsible for mines but, as outlined above, combines the regulatory functions with ownership and production of mineral commodities. The lack of



distinction of these functions will be a severe hindrance to development of the mining sector.

Under the “Ministry as Regulator” model, most countries have developed some important commonalities in terms of functions. The central Ministry generally:

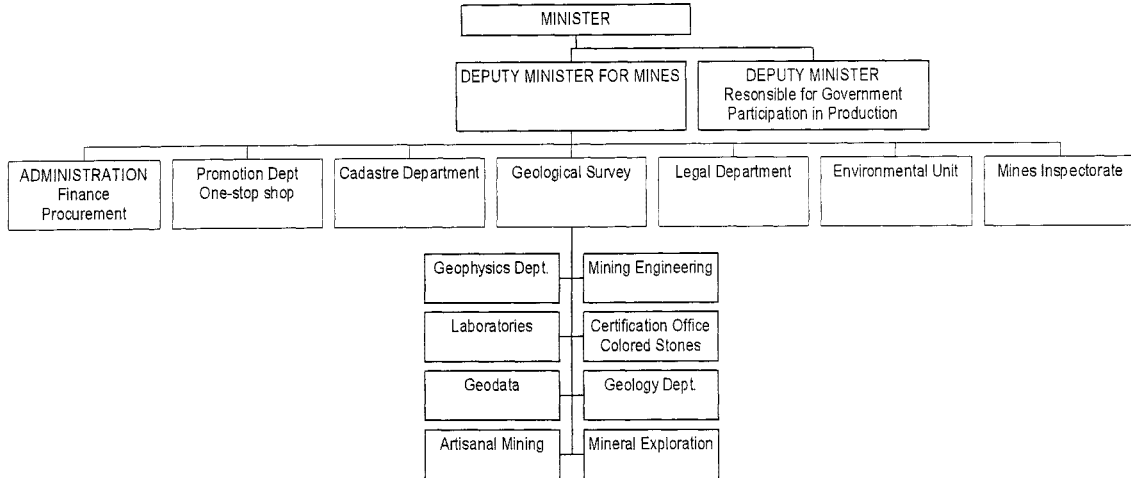
- 1- Formulates policy and provides advice to political leadership;
- 2- Administers mineral rights and concessions;
- 3- Assists in environmental permitting of operations;
- 4- Develops infrastructure for geology and mining development;
- 5- Controls and regulates enforcement capability.

Within the Ministry, the following departments are usually found:

- **Mining Cadastre Unit**, responsible for the granting, the registration and the cancellation of mining rights.
- **Environmental Permitting Unit**, responsible for the evaluation of environmental impact statements, issuance of operating permits and the coordination of sector activities with other environmental protection agencies.
- **Mining Inspectorate Unit** is responsible for monitoring and control of mining sector activities as well as for the transparent and uniform enforcement of laws and regulations.
- **Geological Survey** is responsible for acquiring and organizing geo-science information over the country, as well as developing, maintaining, and providing access to all geological and associated mineral sector related.
- **One-stop shop for investor enquires**, (e.g., the planning department), would provide necessary geological and investment data to potential investors and private sector companies and, in addition, coordinate contacts with other official government departments.

## A PROPOSED NEW STRUCTURE FOR MMI

A possible new structure which could be considered for MMI is presently schematically as follows.



The new mining legislation under preparation will help to clarify the mandates and the organizational structure of the MMI. In particular, with the emphasis on the regulatory functions, a proper mine cadastre office should be established to handle mine title registration and supervision. Also, the MMI needs a proper legal department in-house since it may have occasion to negotiate with private parties. A “one-stop shop” should also be established to provide direct links to private sector investors. It is also important that an environmental unit be set-up within the Ministry. There used to be such a unit at the Ministry but there has been virtually no activity in the environmental area since 1993. Finally, the new proposed organization includes a Deputy Minister in charge of State participation in production operations. This post is proposed as a transitory measure, taking into account the need to clearly distinguish within the Ministry the regulatory from the production functions. In most countries where the State has an equity or other direct fiduciary interest in production operations, a unit within the Ministry of Finance is responsible for supervision of the portfolio investment.

### The Afghanistan Geological Survey

The Afghanistan Geological Survey is a separate institution dependent on the Ministry, an organizational set-up not unlike that found in other countries. AGS can, and should, be a critical link in developing the sector. However, there are two critical hindrances in this respect.

First, AGS will need to re-orient its mandate and fundamentally change the way it has approached its work. In the past, the AGS surveyed mineral deposits, proved up reserves, and then turned the deposit over to a State agency (generally a department or enterprise

within the ministry) for development and exploitation operations. This function is not consistent with the new model of “ministry as regulator”. In most other countries, the role of the geological survey is to provide basic scientific and geo-science information to the private sector. This information includes, predominantly, regional geological maps (1:200,000 scale is frequently used) and Geographic Information Systems applications. This information is held by the government and used for a number of purposes in addition to minerals development, such as land use planning, environmental protection, seismic research, agricultural production, and others. It is important that the information be made available to the public at nominal cost. Also, private companies which conduct exploration are generally required to turn over the data and reports to the Ministry on a periodic basis. Once the permit is relinquished by the company, the data reverts to the government which then integrates it into the national database.

The second problem is that the present physical and logistical conditions at AGS are very poor. The existing facilities are simply not functional: no water, sanitary facilities, office equipment or supplies, electricity, dangerous and unhealthy working conditions. Very little work has been done to rehabilitate the facilities, though some improvements have been noted over the past several months. The staff of AGS, some 700 persons, continue to diligently report for work. They have shown good initiative to manage to save and salvage much of the geo-science information collected over the past 50 years, yet there remain significant missing elements. Some progress has been made with German technical assistance funding (GTZ) to organize and catalogue around 1,500 reports and books. There is also significant interest with the government of the United Kingdom and the United States to fund work at the AGS. Amounts of US\$ 5 million for the United Kingdom and around US\$ 15 million for the United States have been mentioned. The work proposed would be to re-establish the geological database and infrastructure of the country, provide assistance to the ministry for the regulatory functions, and provide some assistance in the rehabilitation of the facilities.

# ANNEX 1

## POSSIBLE ELEMENTS OF A MINING SECTOR POLICY AND STRATEGY

The government of the Transitional Islamic State of Afghanistan is considering adoption of a mining sector strategy and policy. Provided below are some elements, consistent with international best practice, which may be considered in the preparation of this sector policy and strategy.

### **Introduction and Background**

Mining can, and does, contribute to economic development and human well-being. If conducted in an environmentally sustainable manner, exploitation of mineral resources can provide substantial tax revenues to central and local governments, create direct and indirect jobs, and stimulate spin-off industries in and around the mining operations. These beneficial effects and the development of a vibrant mining sector have so far eluded Afghanistan. While the country has excellent geological potential the mining sector is little developed. This is because of the lack appropriate policies and legislation in respect of the sector, the security situation in some parts of the country, and the destitution of the public institutions responsible for the sector.

Over the past 30 years there has been a considerable amount of research on Afghanistan's mineral resources and potential conducted by the government, sometimes with the assistance of international donors. To date, attempts to develop the iron ore and copper deposits as well as others have not proven successful, though some interest in these deposits is now being manifested by potential investors. Exploration has identified occurrences of gold, barite, talc, chromites, and other minerals. A large and high grade deposit of copper (Aynak) has been thoroughly studied and a large iron ore deposit exists in Bamiyan province. There is a considerable semi-precious stone industry undertaken mainly by artisans, which production is not declared to the central government. Finally, the country has reasonably good quality coal resources and some of this is mined for domestic and industrial purposes. The existing small industrial sized coal mines are marginal due to antiquated machinery and lack of new investment. However, there is considerable small scale production. Moreover, coal demand and prices in urban centers has risen rapidly due not only to domestic household energy needs during the winter months but also to increasing industrial demand to fire construction bricks.

The government is aware that development of mineral resources will require investments in excess of government abilities and thus seeks to establish conditions and an enabling environment which is conducive to attracting and retaining investment by both private local and international groups. At the same time, the central government is conscious of

the need to exert its hegemony through appropriate legislation over valuable non-renewable mineral resources which are, at present, being exploited and the revenues captured by factional groups operating in the country. The privatization and/or leasing to private groups of existing state owned mining enterprises is, at present, held up by the lack of adequate mining legislation. Enabling legislation and a proper mineral concession system is needed to establish order in the quarry and construction materials sector. The demands of reconstruction of physical infrastructure is requiring vast quantities of locally sourced quarry minerals, the exploitation of which carries the additional benefits of absorbing large quantities of labor and spawning ancillary industries. Finally, the small scale mining sector is, at present, wholly unregulated and occupies large numbers of persons in difficult security, hygienic, and environmental conditions. To achieve these objectives the government is establishing the present mining sector policy and strategy. Outlined below are the main policy orientations of the government in respect of the sector and proposals for a strategy and action plan to implement these policies.

### **Policy Objectives**

The ten principal objectives of the mineral and mining policy are to:

1. exert central government sovereignty and hegemony over non-renewable mineral resources located throughout the national territory;
2. stimulate and mobilize local and international private investment in minerals exploration, development and production;
3. ensure that mining operations are conducted in an environmentally and socially sustainable manner;
4. create job opportunities for local residents and stimulate the development of spin-off and related industries;
5. increase tax revenues accruing to the central government from mining operations and to provide for their equitable allocation and transparent management thereof;
6. promote scientific and geological investigation into the nature and extent of Afghanistan mineral resources and to make such information available to the public and potential investors;
7. strengthen government supervisory institutions to distinguish clearly the functions of regulator from the functions of owner/operator of State mining enterprises;
8. regularize small scale and mining and provide for adequate institutional and technical support of these activities;
9. apply internationally accepted standards and “safeguard policies” to questions of environmental protection, indigenous peoples, involuntary resettlement, and other aspects;
10. promote the transition to operate on a commercial basis of mineral producing enterprises which are currently state owned or reliant on the government.

## **Policies and Actions to Achieve the Objectives**

In furtherance of the objectives, the government declares the following policies and actions.

### ***Creation of a Modern and Internationally Competitive Legal and Regulatory Framework***

The government will create a modern and internationally competitive legal and regulatory framework. This framework will include a basic mining law, regulations, and model investment agreement. The main principles of the legislation will include, but not be limited to:

- All mineral resources are the property of the State and that the Government is the custodian of these resources on behalf of current and future generations;
- The role of the State is to regulate the sector, enforce the legislative instruments which pertain to it, promote private sector investment in exploration, development and operation of mines;
- The transition of State mining enterprises to operate on a commercial basis and according to the provisions of the mining law, regulations and tax regime;
- Government institutions will be given clear mandates and guidelines to apply the legislation and to regulate the sector in a transparent and efficient manner;
- The ministry responsible for mines will contain separate units for the regulatory function and the transition period for the minerals production function;
- State enterprises operating mines will make the transition to operate on a commercial basis;
- Simple, clear and non-discriminatory procedures will be adopted to provide for equal opportunity of access to mineral resources and liberalized free market trade thereof;
- Mineral rights and mining titles (exploration, development and exploitation) shall be registered in a central registry or cadastre system; the obligations of the mine title holder and of the State will be clear, explicit and fully disclosed to the public;
- Special provisions will be established for small scale mining operations as well as exploitation of quarry and construction materials;
- Procedures will be put into place for environmental protection, studies of environmental impact of mining operations, the preparation and application of environmental protection plans and monitoring systems, and the issuance of adequate guarantees for closure, de-commissioning and rehabilitation of mines;
- Private companies which have been duly authorized to explore for minerals shall have exclusivity for their permit area and the automatic right to exploit any minerals found, subject to satisfactory arrangements in respect of environmental protection;
- Distinction shall be made between surface owners and sub-surface rights, the latter having precedence but with the obligation for consultation and compensation of the surface holder;

- The mining taxation regime will be internationally competitive, consistent with the overall taxation policies and regulations and take into account specific sector considerations, practices and protocols;
- All taxes and royalties from mining operations shall be paid directly to the central treasury.
- The mining law will include provisions relative to consultation with communities, protection of indigenous peoples, and procedures for involuntary resettlement;
- Dispute resolution mechanisms will be established, either through the judicial system of Afghanistan or, in the case of foreign investors, through international arbitration.

### ***Institutional Strengthening for the Management of Mineral Resources***

For the efficient management of mineral resources and to provide adequate support for the private sector, the public institutions responsible for the mining sector will be modernized and strengthened. The institutions will include principally the Ministry of Mines and Industries (or successor institution) and the Afghanistan Geological Survey. In addition, other government institutions such as the Ministry of Finance, the Ministry of Interior, the ministry in charge of the environment, and other ministries may be mandated with certain specific aspects of administration of the sector. Finally, supporting institutions such as universities, polytechnics and other educational institutions, community associations and groupings, and non-governmental institutions will be involved with the sector on an as needed basis. The following elements will pertain to these institutions:

- The national budget will provide for adequate logistical, infrastructure, equipment and financial support for the public institutions;
- Emphasis will be placed on professional development of personnel through training and exposure to new and best international practices in the mining industry;
- Public sector institutions will be given clear and consistent mandates and procedures will be established to enhance communication and coordination between them;
- Regional offices of the central departments and ministries will be strengthened in order to reinforce links between the center and the outlying areas;
- Public institutions will place the emphasis on transparency and good governance and specific procedures will be established in this respect;
- The central ministry responsible for mines will establish and, if necessary re-organize, departments to handle policy and administration, cadastre services, mines inspection, health and safety issues, environmental matters, commodity certification and quality control, and geological survey and laboratory services;
- The government departments will develop programs for promotion of the mining sector to potential local and foreign investors;

- A tendering program will be developed for mineral deposits for which the government has detailed and complete geological information of a nature compatible with “pre-feasibility” stage;
- Plans will be developed and implemented for the rehabilitation and eventual privatization of state owned enterprises;
- Public institutions will strive to integrate mining activity into community level development plans, including resolution of conflicts and examination of alternative economic options;
- Special departments will be established to support small scale mining.

### ***Establishment of an Internationally Competitive Taxation Regime***

One of the principle benefits of mining of mineral resources is to provide tax revenues to the government. The government policy is to put into place a taxation system which is on the one hand internationally competitive in terms of rates and methods of taxation and, on the other, provides the maximum amount of revenues to the State commensurate with exploitation of non-renewable mineral resources. The taxation system also requires adequate procedures of the government for distribution of the revenues to central and local jurisdictions as well as the management of the revenues once distributed. In general, the taxation regime for the mining sector should follow closely the overall system of taxation in Afghanistan, but also make specific provision for mining related taxes and conventions. Accordingly, government policy is to:

- Assess royalties on production of mineral commodities;
- Apply without exception or exoneration existing taxation on profits of enterprises;
- Assess land use and surface rental fees;
- Collect property and other taxes due to local municipalities, provided that these are not in contradiction to national taxes;
- Desist from taking an equity participation in mining ventures in the place of assessing and collecting taxes;
- Provide certain exemptions from customs and value added taxes, to the extent that these could impede or otherwise hinder minerals exploration and exploitation;
- Apply internationally recognized accounting principles to mining operations;
- Publicly disclose taxes and other payments made by mineral producers and investors.

### ***Reinforcement of Geological and Geo-science Database***

The aim of the Government's policy is to update and strengthen the basic geological and mining information. This information is necessary for the promotion of private investment for exploration and mine development as well as for the sustainable social and economic development of Afghanistan. It involves the development of baseline geological infrastructure, which is an important public service performed by the state in all countries, and which benefits different activities such as mining, infrastructure



construction, water resources management, land-use and planning, and environmental planning.

In particular, with the assistance of the national budget and possibly foreign donors, the following elements will apply:

- Personnel of the survey will be trained in modern geo-science methods and re-skilled in terms of regional mapping and GIS requirements;
- The laboratories at the AGS will support the new emphasis on providing geological information to the private sector and to provide support to government institutions to carry out their mandates;
- Resource assessments will be conducted and priorities for development established;
- Project promotion datasets and materials will be created for promoting investment in known or prospective areas; a special unit within AGS will be created for this purpose;
- A new reserve classification system will be put into place which will be consistent with international standards;
- The AGS will conduct geologic mapping and resource assessment on a regional scale for the account of the government and, possibly, as sub-contractor to private firms, provided there are no conflicts of interest;
- Documents, maps, reports and other materials prepared by the AGS will be made available to the public at nominal charge.

### ***Improvement of Small-scale Mining***

Small-scale mining activities represent an important source of income for a growing number of rural population in Afghanistan. At present, small scale mining contributes fairly large amounts of quarry, construction and coal materials to the market. There is also substantial production of gems and semi-precious stones. However, this activity takes place without formal authorization and State institutions have difficulty in regulating the activities. Additionally, small scale mining often has significant environmental, health, and safety problems as well as potentially conflicts with surface land owners. Therefore, the Government's policy is to regularize and improve small-scale mining in order to realize its benefits and avoid its adverse impacts. To implement this policy, the following measures will be taken:

- adoption and enforcement of regulations and guidelines for small-scale mining;
- provision of extension services to the miners, provided by government centers and also possibly local and national mining associations, to provide training and guidance to improve technical and environmental aspects;
- provision of information on available production and marketing options to facilitate the commercialization of mineral products;
- establishment of a training center for cutting and polishing gem and semi precious stones as well as objects of art, handicrafts and jewelry from minerals;

- promotion of awareness of mining related social, health and environmental issues;
- raising awareness of small scale miners on regulatory matters and mineral rights, and promotion of organizations of such miners in small groups or cooperatives;
- provision of guidance through government departments on technical aspects (mining methodology, mineral reserves, appropriate processing technology), development of pilot training centers for small-scale mining, and marketing mechanisms.

### *Establishment of environmental and social management capacity*

The aim of Government's policy is to minimize and mitigate the social and environmental impacts of mineral exploitation and to promote sustainable development. This will require development of satisfactory environmental and social capacity for the mineral sector at the Ministry of Mines and Industries as well as at other government agencies dealing with environment and social matters. This requires:

- Establishment of modern environmental legislation, guidelines and procedures;
- Development of capacity for environmental and social management at respective government institutions both at the central and regional offices;
- Preparation of environmental and socio-economic baseline studies and audits of selected mining areas;
- Strengthening the capacity of communities affected by mining, on principles of environmental and social management, on development of procedures for participatory consultation;
- Development of regulatory and enforcement mechanisms to ensure protected zones against illegal mining.

## ANNEX 2

### ADDITIONAL ACTION STEPS FOR SECTOR RECOVERY OVER THE NEXT TWO YEARS

The Afghanistan Ministry of Mines & Industries has previously put forward several action steps to recover the mining sector (see Proposed Development Projects, for the Years 2004, 2005, 2006). This report proposes additional action steps that complement those defined by the MMI. These additional actions place emphasis on smaller tasks that will have immediate results – strengthening and sustaining current sources of mineral supply.

Action steps that warrant immediate implementation are further elaborated upon in Annexes 3 to 6; with pertinent supplemental material, Terms of Reference, in Annex 7. Background information regarding current mineral production and information gaps in the understanding of mineral resource potential is included in Annexes 8 and 10 respectively.

Of particular interest will be the information regarding the tending of mineral deposits, included in Annex 9. This provides the reader a comprehensive overview of issues associated with international property offerings such as the Aynak copper deposit. Often associated as a longer-term strategy, this is one task that might bring meaningful investment in the metals sub-sector earlier in the program.

The following action steps, if started immediately, could sustain current mineral supply and provide meaningful sector recovery using home-grown enterprises.

- ***Mineral Policy Specialist*** – There is an immediate need for an interim mineral policy specialist to provide (i) strategic planning and coordination of several donor-lead activities within the sector, (ii) development and implementation of programs targeted towards sector growth, (iii) building stronger links between programs of the MMI and those in other ministries including Infrastructure and Energy, and (iv) assist in strengthening of professional capacity. For additional information see ToR in Annex 7 - Appendix A.
- ***Interim Coal Assistance Program*** – Providing immediate technical / financial assistance to existing coal operations in order to sustain supply pending longer-range development activities. For additional information see (i) Annex 3: Immediate Assistance Strategy To The Coal Sector and (ii) ToR in Annex 7 - Appendix B).

- ***Artisan Crafts Facility and Crafts Exchange*** – A strategy to develop an (i) artisan craft facility (using Afghan lapis lazuli, onyx, and other ornamental stones), and (ii) Exchange for the sale and export of high-value finished products. The strategy makes use of natural market forces using incentives to attract producers of ornamental stones (originally) and gemstones at a latter point in time. Both the crafts facility and crafts exchange provide a secure environment for a sector that is currently a principal contributor to smuggling. For additional information see (i) Annex 5: Assistance To The Gem And Ornamental Stone Industry, and (ii) ToR in Annex 7 - Appendix C).
- ***Water Resource Assessment*** – A preliminary assessment of water resources, in support of coal assessment activities and requirements for power generation. Coal mining and power generation issues are inseparable from water issues. For additional information see Annex 6: A Strategy to Improve Understanding of the Mineral Resource Potential.
- ***Quarry Extension Service*** -- Development of an extension service for quarry operators that are currently unlicensed, informal businesses. An extension service would serve to develop small-to-medium enterprises that contribute significantly to economic growth. For additional Information see ToR in Annex 7 - Appendix B.
- ***Small Scale Miner Extension Service*** – to provide ongoing expertise relating to safety, productivity, and business development at the micro-business level. For additional information see ToR in Annex 7 - Appendix E.
- ***Tender of Aynak*** – a task to prepare the Aynak copper deposit for public tender. This program will require the expertise of a (i) mining engineering firm to prepare the geological / ore reserve package and (ii) a private investment bank to advise the government on the tender process. For additional information see ToR in Annex 7 - Appendix F.
- ***Mining Cadastre Office*** –to administer mining licenses, titles, and land holdings and associated assessment requirements. For additional information see ToR in Annex 7 - Appendix G.
- ***Corporatization*** – A task targeted towards improving existing mining operations by changing business practices to a commercial basis. Targeted towards improving financial performance, this program increases productivity within the sector. For additional information see ToR in Annex 7 - Appendix H.

TASK	Expenditures (Annual \$mil)			
	2004	2005	2006	Total
Mineral Policy Specialist	0.2			0.2
Immediate Assistance to Existing Coal Operations	3			3
Proposed BGS Human Resources Development of AGS	1			1
Proposed USGS Geospatial Infrastructure Development	1			1
Proposed USGS Mineral Resource Assessment: Phase I – Coal	3	3	1.5	7.5
Proposed USGS Mineral Resource Assessment: Phase II – Base and Precious Metals	2	4	2	8
Proposed USGS Water Resource Assessment (in support of (i) coal and (ii) oil & gas assessments)			1.5	1.5
Establish an Artisan Crafts Facility using lapis lazuli, onyx, and other high-value semi-precious stones that can be branded in the international market.	.40			.4
Proposed BGS Mines Administration Office, AGS Laboratory Facilities, MMI /AGS website, Remote Sensing Capabilities, Museum and Library Facilities	1	1		2
Development of a Quarry Extension Service	0.2	0.15	0.15	0.5
Development of a Small Scale Miners Extension Service	0.2	0.25		0.45
Tender of Aynak	0.250	0.15	0.15	0.55
Mining Cadastre Office	0.3			0.3
Feasibility plan for corporatization of Existing Operations	0.2			0.2
	<b>\$11.0</b>	<b>\$8.55</b>	<b>\$5.30</b>	<b>\$26.6</b>

## ANNEX 3

### IMMEDIATE ASSISTANCE STRATEGY TO THE COAL SECTOR

Afghanistan appears to have extensive coal resources, though geological information is outdated and respective assessment needs to be undertaken to determine the country's full production potential. The coal mining production is in several different provinces, of which three have been reviewed in the field by Bank missions, that visited 6 coal mines in Baghlon, Bamyan, and Nengerhar (Jalalabad), out of 11 main coal mines in the country. The thermal quality of the coal at mines visited was low with calorific values between 5,200-5,500, and an ash content in excess of 12%. These mines have a small but capable technical staff, trained in Russia, Czechoslovakia, and at the Technological Institute in Kabul, under Russian assistance programs.

Current annual production is low, below 60,000 tons at the Baghlon and Bamyan mines. According to the Ministry of Mines and Industry, about 4000,000 tons of coal are produced annually in Afghanistan by Government operated mines and artisanal private miners. However, overall coal production in the country is declining, and represents only 20-25% of levels reached during the 1970s. This is because virtually all the equipment of the mines has worn out, reducing the operations to rudimentary manual mining activities.

Coal is used locally for cooking and heating purposes as well as for textile, sugar, bread, brick kilns and cement industries located nearby the mines, and in the Kabul region; there has been limited use of coal to date in power generation. Simple replacement of dilapidated mining, transportation, maintenance and office equipment would enable production to return to levels reached during the 1970s.

In evaluating the coal sector, there is a need for an approach that provides (i) Interim Actions to sustain current levels of coal supply and improve working conditions, safety, and the environment for thousands of workers at existing operations, and (ii) Longer-Term Actions to meet future energy needs of Afghanistan:

#### **Interim Actions**

With relatively modest expenditures, interim assistance has two elements;

- (i) Emergency Rehabilitation Investment (\$3 million). The objective is to have an immediate impact on existing supplies of coal for household and industrial uses. The program would improve current levels of production and maintain employment to some 15,000 direct and indirect dependents in the Baghlon and Bamyan provinces. Mines requiring assistance include the principal coal fields at Sabzak and Norgh (Karkar, Dudkash, Nahrin, Dareh Soof, and Ashpista &

- Duaab). The financing would be used primarily for (a) a two-phase program to initially assess immediate equipment needs, health and safety issues, and later to provide training on new mining equipment (\$0.3 million); and (b) replace essential mining equipment in those coal mines where production can be improved, and improve health and safety conditions (\$2.7 million).
- (ii) Mine Planning at Currently Producing Sites (\$0.5 - \$0.75 million). Consultants would be contracted to assess currently producing sites, seeking to provide (i) a targeted-inventory of reserve potential, with recommendations for further exploration; and (ii) rudimentary mine planning to artisan operations. The targeted-inventory of reserve potential would be based upon compilation of historical resource / reserve data, together with new field observations on surface and from underground workings.

Areas warranting further resource evaluation would be selected based on a minimum, threshold of inferred tonnes of coal. This threshold serves as a geological filter, passing a limited number of candidate areas forward for further evaluation in a future program. The consultant would provide for each candidate area:

- a. exploration targets for testing by drilling or subsurface exploration,
- b. costs and an implementation plan for an exploration program.

The future exploration program would be funded separately, either as part of the country-wide resource assessment program discussed below, or in conjunction with that program.

This effort is targeted towards sustaining and improving current coal supply during which coal resources countrywide can be assessed (see bullet below). This interim strategy may sustain current production levels for the next 3-5 years.

### **Longer-Term Actions**

Beyond currently producing sites, little is known about additional coal resources within the country. The current suite of coal mines were located using a command-control economy whose objectives are no longer relevant. Alternative coal resources may provide larger economic, environmental, and social benefit to the country – subject to proposed infrastructure development and / or regional energy market considerations.

(i) Coal Resource Assessment (\$7 million). An international geologic survey would be contracted to assess the quantity and quality of coal resources country-wide. Concurrent with this program would be a further evaluation of candidate exploration targets carried forward from the interim mine-planning program discussed above. This program is expected to require 3 years.

(ii) Long-Range Development Planning (\$0.5 million). An energy consultant would be contracted to integrate the (a) assessed coal reserves at existing operations with (b) country-wide coal assessments and exploration results. The consultant will define an

integrated coal development plan (road map). This plan would consider (a) the economic impact of existing and proposed infrastructure development (road, rail, and transmission), (b) proposed power generation projects, (c) the availability of water and other inputs to coal-fired power production, and (d) alternative energy resources within the region. This program is expected to require 9 months.

	2004	2005	2006	2007	2008
<b>Interim Strategy</b>					
Sustain current levels of coal supply and assess reserves at existing operations	-----				
<b>Longer-term Strategy</b>					
Large-scale coal development					—————
Artisan / SME's					-----

### Specific Interim Action Steps

In the Interim assistance, some specific actions are needed immediately for both (i) Emergency Rehabilitation Investment, and (ii) Mine Planning at Currently Producing Sites (see Terms of Reference: Annex 7, Appendix B – Interim Technical Assistance to Coal Mines).

Key steps within the Emergency Rehabilitation Investment assistance would include:

- assess equipment needs, as per the MMI lists, equipment specifications, and sources of supply;
- estimate interim capital-cost improvements and identify suitable procurement sources;
- identify principal health and safety issues of concern, ranking them according to impacts on the well-being of workers;
- assess what actions are being taken by the broader donor community on these issues;
- develop an easy-to-understand training standard to improve the overall level of safety and working environment at the mines;
- develop an implementation plan for both training and capital investments needed at the mines.

Key steps within the Mine Planning assistance would include:

- Assess the quantity and quality of coal reserves, including a consideration of mining hazards at the mines listed above.



- Prepare development plans, in consideration of equipment and training improvements noted above. This plan may include consolidation, closure, and expansion of operations within an overall objective to sustain or improve current production levels and maintain full employment.
- Develop a program for implementation of new mining schedules at each operation, with corresponding technology transfer to ensure production schedules can be sustained.

## ANNEX 4

### ASSISTANCE TO THE CONSTRUCTION MATERIALS SECTOR OVER THE NEXT TWO YEARS

#### Construction Materials

Construction materials (aggregate, cement, asphalt) and industrial minerals will be essential to support planned infrastructure reconstruction programs in Afghanistan. However, the construction materials / industrial minerals sector is perhaps the least understood with respect to the location, quality, and quantity of available resources and whether these resources can be produced at a price that can be supported by end-use markets.

Generally dominated by small to medium enterprises (SME's), the Afghan construction materials / industrial minerals sector is largely informal and without the professional capacity needed to meet the upcoming infrastructure reconstruction challenge. If this sub-sector is not formalized, the end-result is expected to be:

- continued unlicensed production in which MMI has no resource hegemony in controlling the location or magnitude of production, nor enforce or collect royalty payments;
- inferior product being supplied to major highway and construction markets, leading to higher maintenance costs, inferior performance of infrastructure, and inefficient use of donor aide;
- ongoing disregard for worker well-being in which unregulated production does not permit worker health and safety provisions, nor the introduction of technological innovations that improve industrial efficiency.
- shortage or disruption of supply. Although Afghanistan will need to reconstruct 3,200 km's of road, and commercial, residential, and public buildings – there is no coherent plan to supply the millions of tonnes of crushed and other materials that are needed.
- continued conflict between pits and quarries and competing land-uses in the urban interface. If formalized, these resources could be harvested in advance of urban development, allowing for reclamation and alternative land-use.
- continued environmental degradation from unlicensed operations in environmentally sensitive areas. A reliance on alluvial aggregate will continue to impart severe environmental damage to fragile river systems around the major urban centers. There must be market incentives to facilitate the development of larger scale quarries.

### *Construction Materials Objectives*

Assistance to the construction materials sector will need to:

- create an extension service for quarry operations in order to provide technical assistance on issues of production, processing, and material sales;
- provide economic incentives that encourage compliance with regulatory and fiscal obligations;
- provide mechanisms that reduce reliance on unlicensed operations and shift market focus onto licensed operations providing higher-quality material;
- define programs that enable growth of SME's in quarry operations through implementation of technical standards on larger infrastructure projects, while also providing opportunities for licensed artisan operators in less rigorous residential applications.

Over the longer-term, there is a need to assess construction materials with a focus on ensuring sufficient supply for major infrastructure development projects:

- define geologic resources by location, quality, and quantity; giving consideration to (i) application in various end-use construction markets, and (ii) the type of material demanded.
- Define demand scenarios, by location and across time for (i) transportation and other infrastructure development, (ii) commercial and residential construction, and (iii) schools, airports, hospitals, and other public buildings. Demand scenarios must be harmonized with planned reconstruction activities by the donor community.
- Resolve which production locations are most appropriate in light of (i) planned urban development, (ii) projected market demand across time, (iii) economies of scale in production costs, and (iv) quality of construction material in geologic sources.

This assistance to the construction materials sector should begin immediately and will have meaningful results by (i) quickly formalizing a small-to-medium enterprise sector, (ii) increasing mineral royalties and taxes paid from resource development; and (iii) improve the quality of product entering the market, especially in large, donor-supported highway construction projects.



## ANNEX 5

### ASSISTANCE TO THE GEM AND ORNAMENTAL STONE INDUSTRY OVER THE NEXT TWO YEARS

With one of the richest endowments of gems and ornamental stone, Afghanistan is realizing little economic benefit from current production that is largely smuggled to Pakistan for sale. After twenty-five years of war, the full potential of the Afghan ornamental stone and gem industry remains to be realized. The economic potential is significant, with current production estimated at \$2.5 million and imparting significant economic benefits in the producing districts of the Panjsher valley northeast of Kabul and at Jegdalek, to its Southeast.

Ornamental stone that includes lapis lazuli, onyx, and marble; and quality gems that include emeralds, aquamarines, rubies, spinels, tourmaline, are known to occur within Afghanistan. To realize the potential offered by these resources, the Afghan Ministry of Mines and Industry (“the MMI”) has proposed a multi-phase program to:

- (i) introduce a new mining law offering competitive royalty rates for the sale of gemstones within Afghanistan;
- (ii) perform a geologic resource assessment for ornamental stone and gems, in a cooperative agreement with international geologic surveys in order to:
  - a. describe by location, the quantity and quality of known ornamental stone and gem deposits
  - b. define the potential for additional ornamental stone and gem resources through additional geologic mapping, prospecting, and application of sensing technologies
- (iii) develop, in partnership with a non-governmental organization, an artisan facility in Kabul, offering high-quality artisan crafts made from ornamental stone within a one-stop shop for buyers seeking to purchase and export these goods;
- (iv) provide training to further develop the artisan community in Kabul;
- (v) develop an exchange that facilitates for buyers the export of these crafts within a safe and secure environment, and by offering international banking services to this end.

To this end, the Afghanistan Ministry of Mines and Industry (“the MMI”) of the Islamic Transitional Government of Afghanistan (“the Government”), has requested the assistance of one or more suitably qualified specialist(s) to study the feasibility of a:

- (i) Artisan Crafts Facility – to determine the technical requirements and economic viability of a proposed Artisan Crafts Facility in Kabul, using ornamental stone, and
- (ii) Artisan Crafts Exchange – to develop a business plan for an international sales center buyers ease of export, international exchange services, and other support banking functions.

## **Unique Aspects Relating to the Production of Gems**

The Artisan Crafts Exchange is viewed as a catalyst to eventually attract gem suppliers into the convenience of selling directly to international buyers within a formal exchange facility in Kabul. The benefits of selling gems through this facility include (i) removing intermediary handling charges associated with smuggled gems and (ii) offering buyers the comfort and safety of exporting stones under an official program sponsored by the government.

Afghan gems pose unique considerations in that these are family-run operations across many generations and spanning the Afghan / Pakistan border. This sector cannot (easily) be regulated into compliance by the Government in Afghanistan and therefore economic incentives are preferred to attract gem producers to the convenience of doing business in Kabul.

By assembling buyers in a central location, increasing the level of comfort and safety in which gems might be sold, and facilitating export paperwork – the sector might slowly be formalized using natural market forces. Additional economic incentives might include:

- Facilitating the export of raw gems to Thailand and other locations for cutting; and then returning them to Kabul for sale;
- Increasing the level of artisan participation by establishing gemstone-mounting and jewelry industries within the artisan crafts facility working with ornamental stone;
- An international advertising campaign that “brands” officially exported high-quality stones, thus increasing international interest and prices.

This strategy of working the problem from the buyers side has been successfully employed in similar programs in Tanzania and Zambia.

## **ANNEX 6:**

### **A STRATEGY TO IMPROVE UNDERSTANDING OF THE MINERAL RESOURCE POTENTIAL**

#### **Background**

Historically, Afghanistan has a long tradition of geologic mapping, with many foreign agencies executing large mapping programs over the past century. During the 1990's, civil war led to the scattering of the geologic information repository. Whereas much has been recovered, information gaps remain. Furthermore, there is a need to reevaluate historic geologic data using new sensing technologies and geologic models developed over the past thirty years.

A joint data collection and mineral resource assessment strategy is proposed to (i) improve current understanding of the mineral resource inventory, and (ii) allow long range planning based on the potential economic contributions by these resources. Of particular importance is the impact of proposed infrastructure improvements on resource potential. Large infrastructure costs can prevent otherwise attractive deposits from realizing commercial production. This linkage between mineral resource assessment and infrastructure is paramount in the evaluation of long-range, economic development and land-use planning alternatives.

#### **Geological Data Collection**

The AGS headquarters in the east-central section of Kabul was visited by the mission team on several occasions to assess the coverage, extent and quality of existing geological and mining project information in Afghanistan. The maps and reports saved from the war represent reportedly 90% of the pre-war documents. These are stored in the new documentation centre on the fourth floor of the AGS headquarters in Kabul. The documentation consists of a set of four rooms recently restored with funds provided by the German GTZ aid agency. GTZ also provided two computers and printers be used to produce a registry of all the recovered reports once power is restored.

At the time of mission team's visit, AGS personnel were busy registering the reports into a hardcopy notebook. This involved assigning a catalogue number to the report along with its title, the year of its publication and name of the author. The main objective of this work was to produce a catalogue of the reports available at the AGS.

Of note is the fact the titles of the reports entered into the notebook are in three different scripts (Arabic, Cyrillic and Western) and in at least four different languages. Further, the registration did not include assigning a subject name or acronym for the different

categories (e.g. general geology, mine assessment, pre- or feasibility report etc...) or keywords. The fact the entries are in different scripts will cause a problem when the digital capture of the reports begins, and the absence of subject names and keywords will seriously impede later searches for relevant reports.

To date, no mapping has been undertaken to fill information gaps and a new geological data collection program will be needed. This information will support mineral resource assessment activities and be used to demonstrate geological favorability mineral exploration companies.

### **Mineral Resource Assessment**

A mineral resource assessment program is needed to support longer-term economic, land-use, and infrastructure development planning. A mineral resource assessment program generally consists of two parts

(i) a geologic resource assessment that generates:

- the location, quality, and quantity of known mineral resources.
- quantitative estimates (reflecting uncertainty) of the undiscovered resource potential in areas prospective for select commodities.

(ii) an economic assessment using:

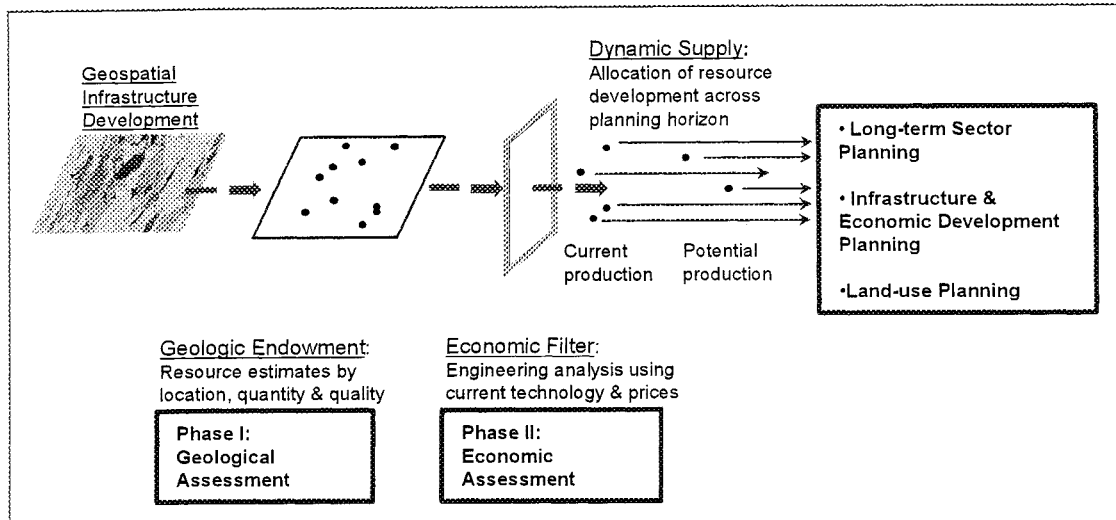
- engineering capital and operating costs (using currently available technologies), and infrastructure analysis, and
- market analysis (using current prices) to assess commercial viability

For some commodity groups, including coal and construction materials, resource estimates are an inventory of the total quantity and quality of the resource known to exist. For other commodity groups, including precious and base metals, resource estimates include both (i) inventories of known deposits (i.e. the Aynak copper deposit), and (ii) estimates of the undiscovered resource potential. The total estimated mineral inventory is referred to as the “endowment”, a stock quantity from which some portion is available for production now and some portion might only be available through additional exploration or improved infrastructure that increases economic viability.

The inclusion of undiscovered resource potential in endowment estimates is necessary for long-range land-use and infrastructure development decision making. But, it also requires that resource estimates (being imprecise) be described using uncertainty measures. Land-use decisions predicated upon resource estimates rely on expectations, recognizing that outcome is not certain.

Principal tasks required to assess coal resources: (i) compile historic geological information and combine new field mapping in an GIS data warehouse, (ii) estimate the geologic endowment, (iii) apply engineering costs relationships to define the “economic” resources using current prices and technology, and (iv) pass this information forward to long-range planning.





## TECHNOLOGY TRANSFER AND THE AGS

Both the United States Geologic Survey (USGS) and British Geologic Survey (BGS) have defined comprehensive programs to assess the mineral resources of Afghanistan and improve technical capacity within the Afghanistan Geological Survey. The suite of candidate commodities for assessment include (i) coal, (ii) base and precious metals, and (iii) construction materials and industrial minerals. To prioritize tasks, each commodity group was evaluated in terms of contribution towards essential social, economic, and reconstruction needs.

Resource assessment is information-intensive, imposing increased information demand on the Afghanistan Geologic Survey (AGS) and Ministry of Mines and Industry (MMI). Information “gaps” in geologic, geochemical, geophysical, and water resource data will need to be addressed via additional mapping and new field surveys. Likewise, capacity in mineral deposit modeling, exploration technologies, and engineering analysis will need to be increased.

Much of the information, data management tools, and scientific capacity that will be needed must be developed within AGS and MMI. This obligates the donor community to cast the mineral resource assessment program as principally a technology transfer program. Capacity development will form the foundation of each phase of the assessment program.

To this end, both the USGS and AGS have defined resource assessment proposals based on technology transfer. These proposals have been integrated into one comprehensive program in which the allocation of training within Afghanistan will be maximized. Within the unified proposal, the USGS and BGS have been assigned tasks in accordance with budgets and core competencies.

*Integration of the USGS and BGS proposals into a technology transfer program*

TASK	ASSIGNMENT	COMMENTS
<b>Capacity Development</b>		
AGS / MMI Professional Development	BGS	<ul style="list-style-type: none"> <li>As presented in 3.1.2 of the BGS proposal</li> </ul>
Geospatial Infrastructure Development	USGS	<ul style="list-style-type: none"> <li>According to tasks associated with Section 2. of the USGS proposal</li> </ul>
<b>Geospatial Infrastructure Development</b>		
	USGS	<ul style="list-style-type: none"> <li>As presented in Section 2. of the USGS proposal</li> </ul>
<b>Mineral Resource Assessment</b>		
Oil & Gas	USGS	<ul style="list-style-type: none"> <li>As presented in Section 3. of the USGS proposal</li> </ul>
Coal	USGS	<ul style="list-style-type: none"> <li>Clarify amount of drilling and reserve calculation to be done, if any.</li> </ul>
Water	USGS	<ul style="list-style-type: none"> <li>As presented in Section 6. of the USGS proposal</li> </ul>
Base and Precious Metals	USGS	<ul style="list-style-type: none"> <li>Specify USGS Three-Step Quantitative Resource Assessment Methodology, with application of economic cost filters for undiscovered deposits</li> </ul>
Industrial Minerals Gemstones Construction Materials	BGS	<p>For Aggregate:</p> <ul style="list-style-type: none"> <li>specify use of GIS-based transportation model working in conjunction with projections of supply and demand by end-use (road construction versus residential / commercial) by area (urban subdivisions).</li> <li>specify that quarry aggregate is assessed separately from alluvial aggregate.</li> </ul> <p>For Industrial Minerals</p> <ul style="list-style-type: none"> <li>specify that economic filters are based on market analysis that considers projections of supply and demand, market loss from potential imports and technical substitutions,</li> <li>new end-use markets that could be created from the creation of small-to-medium enterprises for down-stream value-added processing</li> </ul> <p>For Gemstones</p> <ul style="list-style-type: none"> <li>harmonize the geologic assessment with an initiative to study the commercial viability for a cutting and polishing facility in Kabul.</li> </ul>
<b>Artisan small-to-medium enterprises</b>		
	BGS	<ul style="list-style-type: none"> <li>specify a feasibility of end-use markets, both domestic and export, together with an economic cost analysis, otherwise as presented in Section 3.3.3 in the BGS proposal</li> </ul>
<b>Mines Administration Office</b>		
	BGS	<ul style="list-style-type: none"> <li>as presented in Section 3.4 in the BGS proposal</li> </ul>
<b>Laboratory Facilities</b>		
	BGS	<ul style="list-style-type: none"> <li>as presented in Section 3.7 of the BGS proposal</li> </ul>
<b>Museum &amp; Library Facilities</b>		
	BGS	<ul style="list-style-type: none"> <li>as presented in Section 3.8 in the BGS proposal</li> </ul>



### ***USGS Proposed Tasks***

<b>Task</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
<b>Geospatial Infrastructure Development</b>					
GIS NSDI					
<b>Mineral Resource Assessment</b>					
Oil & Gas					
Coal					
Water (in support of coal)					
Base and Precious Metals					
USGS Capacity Development programs					

### **2004 Assistance Strategy**

- World Bank – develop a multi-agency working group to complete the final draft and submit the law for Presidential Decree
- USGS – resource assessment strategy beginning with
  - Geospatial Infrastructure Development, and
  - The coal resource assessment program (see Appendix A)
- BGS – institutional strengthening strategy, beginning with
  - Professional capacity development at AGS / MMI
  - The establishment of a National Cadastre System
  - The construction materials, industrial minerals, gemstones resource assessment program. (see Appendix B)

Whereas the BGS will lead on institutional strengthening at the MMI and AGS, there is a need for a high degree of coordination with the USGS resource assessment program:

- BGS provides technology transfer on human skills strengthening, management, organizational structures, business acumen, geoscience learning, construction and industrial minerals resource assessment methodologies, mines administration, and laboratory / library sciences;
- The USGS provides technology transfer on geospatial infrastructure development, geophysical and geological field surveys, coal and metallic minerals resource assessment methodologies, and water resource assessment.

Both agencies will need to provide concurrent technology transfer on resource economics, specifically in the economic analysis of geologic resource estimates and the integration forward into land-use planning, infrastructure analysis, regional power analysis (coal), and long-term economic planning.

The World Bank will continue to coordinate this effort, seeking to ensure maximum donor efficiency and net benefits to MMI and AGS.

## **ANNEX 7**

### **TERMS OF REFERENCE FOR TASKS AND PROFESSIONALS NEEDED TO SUPPORT SECTOR RECOVERY (SUPPLEMENT TO ANNEX 5)**

- APPENDIX A : MINERAL POLICY SPECIALIST
- APPENDIX B: INTERIM TECHNICAL ASSISTANCE TO COAL MINES
- APPENDIX C: FEASIBILITY STUDY FOR AN ARTISAN CRAFTS FACILITY AND ARTISAN CRAFTS EXCHANGE
- APPENDIX D: DEVELOPMENT OF A QUARRY EXTENSION SERVICE IN AFGHANISTAN
- APPENDIX E: DEVELOPMENT OF A SMALL-SCALE MINER EXTENSION SERVICE
- APPENDIX F: PRE-TENDER PROGRAM, AYNAK COPPER DEPOSIT
- APPENDIX G: ESTABLISHMENT OF A MINES CADASTRE OFFICE
- APPENDIX H: A CORPORATIZATION PROGRAM FOR MINING ASSETS

## APPENDIX A : MINERAL POLICY SPECIALIST

**Project Title:** Mineral Policy Specialist for the Ministry of Mines and Industry

### 1. Ref:

### 2. Introduction

The Islamic Transitional Government of Afghanistan (“the Government”) has undertaken, with assistance from the international donor community, a comprehensive analysis of the mining and minerals sector to:

- (i) implement a mining law that allows Afghanistan to compete in the international arena for private sector investment in the minerals industry;
- (ii) assess short-term (“interim”) financial and technical needs at existing mining operations, in order to sustain current levels of mineral supplies;
- (iii) fill gaps in the geologic information base with new geological, geochemical, and geophysical mapping and field survey programs;
- (iv) develop an integrated geographic information system framework to manage and archive geodata, and establish a national spatial data infrastructure;
- (v) undertake a comprehensive, quantitative resource assessment program to describe, by location, the quality and quantity of coal, precious and base metals, industrial minerals, construction materials, and gemstones (“a geologic assessment”);
- (vi) apply an economic assessment to the results of the geologic assessment in order to define mineral resource potential in value terms;
- (vii) use the results of the economic assessment in broader economic, infrastructure, and land-use planning strategies;
- (viii) undertake a comprehensive human resources development program at the MMI and AGS to increase business, technical, scientific, and professional capacity through technology transfer programs with international geologic surveys.
- (ix) implement leading IT solutions for the management of digital data, cadastre functions, and industry promotion;
- (x) reconstruct physical assets of the MMI and AGS, including laboratories, library, and representative mineral specimens for study;
- (xi) Involve the private sector in the above activities and development of the mineral resources of Afghanistan.

To this end, the Afghanistan Ministry of Mines and Industry (“the MMI”) has requested the assistance of a suitably qualified mineral policy specialist to assist in this undertaking. These Terms of Reference (ToR) concern the provision of a short-term, international specialist having broad experience in the mining and minerals industry to provide high-level policy advice, guidance on strategic issues, and to further develop an integrated vision for growth within the sector. Given the breadth of programs, the individual must be available at short notice to provide structured, rapid assessments across a core of disciplines including:

- Technical skills relating to mineral development;
- Consultation and stakeholder assessment;
- Institutional assessments;

- Human resource skills;
- Financial and economic skills;
- Project design and supervision skills;
- Project cost / benefit analysis skills.

### **3. Scope of Work**

The scope of work of the minerals policy specialist to the MMI is to:

- accept a short term (six month) assignment based in Kabul City, Afghanistan;
- meet with the Minister of Mines and Industry and his nominated staff and advisors for a briefing on the assignment;
- review relevant documents and projects in connection with the above, as directed by the Minister;
- prioritize issues and develop a six month strategy to provide guidance on key issues across the activities mentioned in Section 3 above;
- be available on a daily (five-day work week) basis to supervise programs, consult with the Minister of Mines and Industry and his nominated staff on issues of concern, act as an advocate for MMI in multi-agency dialogue related to mineral planning and / or development;
- summarize strategies, management programs, and other guidance effectively in reports on a regular basis;
- debrief the Minister and his nominated staff, and other agencies at close of the assignment.

### **4. Expected Outcomes and Deliverables**

The MMI mineral policy specialist will:

- contribute towards an increased level of understanding on complex mineral resource issues;
- ensure that the Minister of Mines and Industry and his nominated staff have a better understanding of the issues and critical actions necessary to develop the sector;
- increased private sector interest in the sector;
- a final report recommending follow-on strategies for MMI and AGS.

Before departure the mineral policy specialist will present their findings to MMI and invited participants to ensure that the final report represents the views of the Islamic Transitional Government of Afghanistan (ITGA).

### **5. Competency and Expertise Requirements**

The mineral policy specialist should have the following skills and experience in:

- +20 years experience in mining, mineral policy development, and international project development;
- a minimum of a Masters in Mining, Business Administration, or Mineral Economics;
- experience in mineral policy development in developing countries;
- designing and developing project and programmes in post-conflict situations;



- understanding of institutional development;
- working knowledge of donor / government interactions, donors practices, procedures, and technical assistance protocols;
- stakeholder consultation and analysis;
- project management;
- a knowledge of Farsi or Dari would be an advantage.

#### **6. Conduct of the Work**

The mineral policy specialist will work in the MMI, in regular contact with the AGS for a period of six months in country. The mineral policy specialist will adopt the highest professional and ethical standards during this assignment. A per diem for work in Afghanistan will be provided.

#### **7. Management and Reporting Requirements**

All reports, spreadsheets and other documentation in the report should be made available to the MMI in electronic format before departure.

## APPENDIX B: INTERIM TECHNICAL ASSISTANCE TO COAL MINES

1. **Project Title:** Interim Strategy, Coal Mine Assistance

2. **Ref:**

3. **Introduction**

The Afghan coal industry is presently operating at low production rates, less than 200,000 tonnes annually. Despite this modest output, the supply of coal is essential for domestic energy / heating and industrial uses. After thirty years of war and chronic neglect, Afghanistan's coal mines struggle to sustain current levels of production, a situation that requires immediate attention.

Longer-term strategies for growth in the Afghanistan coal sector remain several years away. The quantity and quality of coal resources remains relatively unknown and programs to assess alternatives could take up to three years. As such, there will be a continuing reliance on smaller mines at Darrah-I-Suf and Sabjak through 2006.

In addressing this problem, the Afghanistan Ministry of Mines and Industry ("the MMI"), together with the broader international donor community, have defined a two-tiered program to provide:

- (iii) Interim Technical Assistance – a program intended to have immediate impact on existing supplies of coal for household and industrial uses. The program would improve current levels of production and maintain employment to some 15,000 direct and indirect dependents in the Baghlon and Bamyan provinces. The assistance program would (a) assess immediate equipment needs and health and safety issues, and replace essential mining equipment in those coal mines where production can be improved, and improve health and safety conditions.
- (iv) Mine Planning at Currently Producing Sites – a program to assess (a) coal reserves, placing emphasis on artisan surface mining methods; (b) mining conditions and development options, in consideration of health and safety issues, and (c) the market potential for absorbing scheduled increases in coal production from current operations.

To this end, the Afghanistan Ministry of Mines and Industry ("the MMI") of the Islamic Transitional Government of Afghanistan ("the Government"), has requested the assistance of a suitably qualified mining engineer to assist in the Interim Technical Assistance Strategy. These Terms of Reference (ToR) concern the provision of a short-term contract for a mining engineer to assess the condition of currently producing mines, and define operational and capital improvements that will sustain coal supply through the interim period.

#### 4. **Scope of Work**

The scope of work of the mining engineer, for each of the producing sites, is to:

*Mine Rehabilitation*

- assess equipment needs, as per the MMI lists, equipment specifications, and sources of equipment supply;
- estimate interim capital-cost improvements and identify suitable procurement sources;
- assess maintenance needs and estimate annual maintenance costs;
- develop a regular maintenance program;
- develop an implementation plan for capital investments needed at the mines. assess what actions are being taken by the broader donor community on these issues, and coordinate with the Ministry of Mines and Industry, Office of the President of Mines.

#### Mine Planning

- assess coal reserves – inferred geological reserves using surface and underground observation only;
- perform some rudimentary mine planning with respect to improving overall production efficiency by (i) state mining enterprises, and (ii) artisan workers; and develop some local capacity for mine planning;
- identify principal health and safety issues of concern, ranking them according to impacts on the well-being of workers;
- develop an easy-to-understand training standard to improve the overall level of safety and working environment at the mines;
- develop a reasonable production schedule -- reflecting improved equipment suites, improved worker safety, and other efforts to increase efficiency;
- coordinate with officials at the Ministry of Mines and Industry, Office of the President of Mines.

### **5. Expected Outcomes and Deliverables**

The deliverable product will be a report that provides:

- cost estimates of suggested capital improvements, plans for training, equipment specifications, and procurement documents;
- rank-ordered lists of principal health and safety issues with consideration of other donor assistance;
- an easy-to-understand mine safety training program(s);
- implementation plan(s) for equipment procurement;
- regular maintenance plan(s);
- reasonable mine production schedules for each operation.

Before departure the mining engineer will present their findings to MMI and invited participants to ensure that the final report represents the views of the Islamic Transitional Government of Afghanistan (ITGA).

### **6. Competency and Expertise Requirements**

The mining engineer should have the following skills and experience:

- +15 years experience in coal mine planning, coal mine development, and international project development;

- a minimum of a Bachelor of Mining Engineering degree, or equivalent; experience in small scale mining;
- experience in equipment specifications and procurement;
- project management;
- a knowledge of Farsi or Dari would be an advantage

7. **Conduct of the Work**

The mining engineer will work under supervision of the MMI, in regular contact with the coal mine operating divisions. The mining engineer will adopt the highest professional and ethical standards during this assignment. A per diem for work in Afghanistan will be provided.

8. **Management and Reporting Requirements**

All reports, spreadsheets and other documentation in the report should be made available to the MMI in electronic format before departure.

## **APPENDIX C: FEASIBILITY STUDY FOR AN ARTISAN CRAFTS FACILITY AND ARTISAN CRAFTS EXCHANGE**

**1. Project Title:** Feasibility Study for an Artisan Crafts Facility and Artisan Crafts Exchange in Kabul City, Afghanistan

**2. Ref:**

**3. Introduction**

With one of the richest endowments of gems and ornamental stone, Afghanistan is realizing little economic benefit from current production that is largely smuggled to Pakistan for sale. After twenty-five years of war, the full potential of the Afghan ornamental stone and gem industry remains to be realized. The economic potential is significant, with current production estimated at \$2.5 million and imparting significant economic benefits in the producing districts of the Panjsher valley northeast of Kabul and at Jegdalek, to its Southeast.

Ornamental stone that includes lapis lazuli, onyx, and marble; and quality gems that include emeralds, aquamarines, rubies, spinels, tourmaline, are known to occur within Afghanistan. To realize the potential offered by these resources, the Afghan Ministry of Mines and Industry (“the MMI”) has proposed a multi-phase program to:

- (vi) introduce a new mining law offering competitive royalty rates for the sale of gemstones within Afghanistan;
- (vii) perform a geologic resource assessment for ornamental stone and gems, in a cooperative agreement with the British and / or U.S. Geologic Surveys, in order to:
  - a. describe by location, the quantity and quality of known ornamental stone and gem deposits
  - b. define the potential for additional ornamental stone and gem resources through additional geologic mapping, prospecting, and application of sensing technologies
- (viii) develop, in partnership with a non-governmental organization, an artisan facility in Kabul, offering high-quality artisan crafts made from ornamental stone within a one-stop shop for buyers seeking to purchase and export these goods;
- (ix) provide training to further develop the artisan community in Kabul;
- (x) develop an exchange that facilitates for buyers the export of these crafts within a safe and secure environment, and by offering international banking services to this end.

To this end, the Afghanistan Ministry of Mines and Industry (“the MMI”) of the Islamic Transitional Government of Afghanistan (“the Government”), has requested the assistance of one or more suitably qualified specialist(s) to study the feasibility of a:

- (i) Artisan Crafts Facility – to determine the technical requirements and economic viability of a proposed Artisan Crafts Facility in Kabul, using ornamental stone, and
- (ii) Artisan Crafts Exchange – to develop a business plan for an international sales center buyers ease of export, international exchange services, and other support banking functions.

The Artisan Crafts Exchange is seen as a catalyst to eventually attract gem suppliers into the convenience of selling directly to international buyers within a formal exchange facility in Kabul. This removes intermediary handling charges associated with smuggled gems and offers buyers the comfort and safety of exporting stones under an official program sponsored by the government. The program will have as a cornerstone an international marketing campaign that “brands” higher-value Afghan products.

These Terms of Reference (ToR) concern the provision of a short-term contract for one or more specialist(s) to perform the feasibility study for the Artisan Crafts Facility and Artisan Crafts Exchange.

#### **4. Scope of Work**

##### ***The Artisan Crafts Facility***

A feasibility study is needed to determine:

- the economic feasibility of establishing an artisan crafts facility in Kabul, for the manufacture of high-quality lapis lazuli, onyx, and other high-value ornamental stone products.
- a business plan including organizational, staffing and facility plans for a non-governmental organization to manage the artisan crafts facility;
- estimated capital costs and annual budget requirements;
- training requirements for artisan labor;

##### ***The Crafts Exchange***

A feasibility study is needed to determine:

- training requirements for business management of the crafts exchange
- considerations relating to export documentation, international banking services, and other financial / logistical considerations;
- a forward-looking analysis of how gems might be attracted to the facility, including considerations relating to tribal and local leaders in the Panjsher, Badakhshan, Nuristan and Jegdalek regions;
- issues relating to the international promotion (“branding”) of high-quality Afghan artisan crafts and gems;

#### **5. Expected Outcomes and Deliverables**

The deliverable product will be a report that provides:

- a determination as to whether the proposed Artisan Crafts Facility and Artisan Crafts Exchange merit additional consideration;
- a proposed management structure for a non-governmental organization to manage both the Artisan Crafts Facility and Artisan Crafts Exchange;
- capital costs and annual budget requirements for both the Artisan Crafts Facility
- current capacity for both manufacture of the crafts and management of the exchange, and an easy to implement training program;

- points-of-contact and protocol for dialogue with existing artisan craftsmen;
- an implementation plan.

Before departure the specialist(s) will present their findings to MMI and invited participants to ensure that the final report represents the views of the Islamic Transitional Government of Afghanistan (ITGA).

#### **6. Competency and Expertise Requirements**

The specialist(s) should have the following skills and experience:

- +15 years experience in artisan crafts production (using ornamental stone) and sales. Experience with lapis lazuli and onyx (and to a lesser degree emeralds, aquamarines, rubies, spinels, tourmaline) would be an advantage;
- capabilities in economic analysis of the artisan crafts industry using ornamental stone;
- experience in development and management of small business;
- A minimum Bachelor of Science degree in earth sciences, mining engineering, or business management; or certification by the American Gemological Institute or equivalent;
- A knowledge of Farsi or Dari would be considered an advantage

#### **7. Conduct of the Work**

The specialist(s) will work under supervision of the MMI, in regular contact with (i) the Afghanistan Geologic Survey, (ii) the U.S. Geologic Survey and / or British Geologic Survey on resource assessment issues, (ii) current gemstone producers and buyers. The specialist(s) will adopt the highest professional and ethical standards during this assignment. A per diem for work in Afghanistan will be provided.

#### **8. Management and Reporting Requirements**

All reports, spreadsheets and other documentation in the report should be made available to the MMI in electronic format before departure.

## **APPENDIX D: DEVELOPMENT OF A QUARRY EXTENSION SERVICE IN AFGHANISTAN**

**1. Project Title:** Development of a Quarry Extension Service in Afghanistan

**2. Ref:**

### **3. Introduction**

Construction materials (aggregate, cement, asphalt) will be essential to support planned reconstruction programs in Afghanistan. However, this sub-sector remains informal, with production statistics not reported and royalties not paid. Generally dominated by small-to-medium enterprises (SME's) – absent technical assistance provided to this sector, Afghanistan is likely to see continued:

- unlicensed production in which the location and magnitude of production is not controlled, nor royalty payments made;
- inferior product being supplied to major highway and construction markets;
- disregard for worker health and safety issues;
- absence of technological innovations to improve industrial efficiency;
- uncertainty of supply in key regions;
- conflict between pits and quarries and competing land-uses in the urban interface;
- environmental degradation from unlicensed operations in environmentally sensitive areas.

Formalizing the sector requires development of an extension service to provide much-needed technical assistance and allow economic incentives to take hold.

To this end, the Afghanistan Ministry of Mines and Industry (“the MMI”) of the Islamic Transitional Government of Afghanistan (“the Government”), will undertake, with assistance from the international donor community, a comprehensive analysis of the construction materials sector:

- (i) implement a mining law that allows the Afghanistan construction material sector to compete in the international arena by attracting private investment capital;
- (ii) fill gaps in the geologic information base with new geological mapping of construction material sources.
- (iii) develop, by location, an inventory of the quality and quantity of construction material production.

These Terms of Reference (ToR) concern the provision of a short-term contract for development of a construction materials extension service.

### **4. Scope of Work**

The scope of work will be to:

- develop a business plan for an extension service that can (i) provide technical assistance on production, health and safety, and (ii) enforce environmental and regulatory compliance;



- inventory immediate needs with respect to training and equipment, and prepare an associated cost estimate, specifications, and list of procurement sources;
- identify meaningful economic incentives that will assist in formalizing the sector;
- develop a plan for a producers trade association and define avenues by which the industry can present issues of concern to the MMI;

## **5. Expected Outcomes and Deliverables**

The deliverable product will be a report that provides:

- a business plan and strategy to formalize the sector through an extension service;
- identifies issues constraining regulatory compliance and sector growth;
- a mine safety training program;
- a cost estimate of suggested capital improvements, a plan for training, equipment specifications, and procurement documents;
- an implementation plan.

Before departure the dimensional stone will present their findings to MMI and invited participants to ensure that the final report represents the views of the Islamic Transitional Government of Afghanistan (ITGA).

## **6. Competency and Expertise Requirements**

The construction materials specialist should have the following skills and experience:

- +15 years experience in high-level management within the construction materials industry (i) at the production and sales level, and (ii) in providing technical assistance;
- capabilities in economic analysis of the construction materials industry;
- experience in development and management of small businesses;
- A degree in earth sciences, mining engineering, business management, or equivalent;
- A knowledge of Farsi or Dari would be considered an advantage

## **7. Conduct of the Work**

The construction materials specialist will work under supervision of the MMI, in regular contact with (i) the Afghanistan Geologic Survey, (ii) the U.S. Geologic Survey and / or British Geologic Survey on resource assessment issues, (ii) current producers and buyers. The construction materials specialist will adopt the highest professional and ethical standards during this assignment. A per diem for work in Afghanistan will be provided.

## **8. Management and Reporting Requirements**

All reports, spreadsheets and other documentation in the report should be made available to the MMI in electronic format before departure.

## **APPENDIX E: DEVELOPMENT OF A SMALL-SCALE MINER EXTENSION SERVICE**

**1. Project Title:** Development of a Small-Scale Miner Extension Service in Afghanistan

**2. Ref:**

**3. Introduction**

Afghanistan's mining industry (largely coal) is producing at relatively modest levels after nearly thirty years of war. Most mineral production is concentrated in small-scale operations around coal, construction materials, gemstones, and dimension stone. Recovery of the sector is partially predicated on developing increased technical capacity within existing small-scale operations. If well organized, this sector could be used to attract private sector investment,

The Islamic Transitional Government of Afghanistan ("the Government") has undertaken, with assistance from the international donor community, a comprehensive analysis of the mining and minerals sector to stimulate growth by:

- (i) implementing a mining law that allows Afghanistan to compete in the international arena for private sector investment in the minerals industry;
- (ii) assessing short-term ("interim") financial and technical needs at existing mining operations, in order to sustain current levels of mineral supplies ;
- (iii) filling gaps in the geologic information base with new geological, geochemical, and geophysical mapping and field survey programs;
- (iv) undertaking a comprehensive, quantitative resource assessment program to describe, by location, the quality and quantity of coal, precious and base metals, industrial minerals, construction materials, and gemstones;
- (v) involving the private sector in the above activities and development of the mineral resources of Afghanistan;
- (vi) the objectives of the program are spilt between (i) enhancing the productivity of existing small-scale operators, and (ii) establishing larger operations based on significant private sector investment.

An extension service is needed to provide ongoing technical assistance to small-scale miners, principally those providing much needed coal for home-heating and light industrial use. Thus, this program shares common interest with the Interim Assistance to be provided to coal miners on a one-time basis.

To this end, the Afghanistan Ministry of Mines and Industry ("the MMI") requires the development of a small-scale miners extension service to assist in formalizing current operations in the coal, metals, ornamental stone, dimensional stone, industrial minerals, and gemstone industries.<sup>11</sup>

These Terms of Reference (ToR) concern the provision of a short-term contract for development of a small-scale miners extension service.

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<sup>11</sup> A separate Construction Materials Extension Service is to be created.

#### **4. Scope of Work**

The scope of work is to:

- develop a business plan for a small-scale miners extension service that can (i) provide technical assistance on production, health and safety, and (ii) enforce environmental and regulatory compliance;
- develop a capital and operating budget;
- inventory immediate needs with respect to training and equipment, and prepare an associated cost estimate, specifications, and list of procurement sources;
- identify meaningful economic incentives that will assist in formalizing the sector;
- develop a plan for a producers trade association and define avenues by which the industry can present issues of concern to the MMI;

#### **5. Expected Outcomes and Deliverables**

The deliverable product will be a report that provides:

- a business plan and strategy to formalize the mining sector through an extension service;
- a capital and operating budget;
- identifies issues constraining regulatory compliance and growth in the small-scale mining sector;
- a small-scale mine safety training program;
- a cost estimate of suggested capital improvements, a plan for training, equipment specifications, and procurement documents;
- an implementation plan for the extension service.

Before departure the consultant will present their findings to MMI and invited participants to ensure that the final report represents the views of the Islamic Transitional Government of Afghanistan (ITGA).

#### **6. Competency and Expertise Requirements**

The selected consultant should have the following skills and experience:

- +15 years experience in small-scale mining (i) at the production level, and (ii) in providing technical assistance;
- experience in development and management of small businesses;
- a degree in mining engineering, business management, or comparable equivalent;
- a knowledge of Farsi or Dari would be considered an advantage

#### **7. Conduct of the Work**

The consultant will work under supervision of the MMI, in regular contact with current producers. The construction materials specialist will adopt the highest professional and ethical standards during this assignment. A per diem for work in Afghanistan will be provided.

#### **8. Management and Reporting Requirements**

All reports, spreadsheets and other documentation in the report should be made available to the MMI in electronic format before departure.

## APPENDIX F: PRE-TENDER PROGRAM, AYNAC COPPER DEPOSIT

1. **Project Title:** Pre-Tender Program, Aynak Copper Deposit, Afghanistan

2. **Ref:**

### 3. Introduction

The Aynak copper deposit, located in Logar province of central Afghanistan, is a sedimentary-hosted (Zambian-style) ore body. Discovered in 1973, the Aynak deposit consists of two main ore zones at 150 m depth (Central & Western zones), with an addition three poorly defined bodies along strike to the east and south. Surface outcroppings of copper occur around the deposits and as prospects and occurrences along a copper belt extending 25 km long by 15 km wide within Upper Proterozoic sediments.

Embroided in civil war for nearly thirty years, this world-class copper deposit is a key undeveloped resource within the Afghan mining sector. Development of this deposit by the international mining community will serve to open the broader minerals and metals sector to additional exploration and development.

To this end, the Islamic Transitional Government of Afghanistan (“the Government”) has undertaken, with assistance from the international donor community, a comprehensive analysis of the mining and minerals sector to stimulate growth by:

- (i) implementing a mining law that allows Afghanistan to compete in the international arena for private sector investment in the metal mining industry;
- (ii) filling gaps in the geologic information base with new geological, geochemical, and geophysical mapping and field survey programs targeted towards metallic mineral deposits;
- (iii) undertaking a comprehensive, quantitative resource assessment program to describe, by location, the quality and quantity of known copper resources, together with geologic estimates of undiscovered copper resource potential with the Logar copper belt;
- (iv) involving the private sector in the above activities and development of metallic mineral resources of Afghanistan.

### The Aynak Deposit

The Aynak copper deposit is accessible by paved road from Kabul City (35km northeast), and dirt track to Aynak (15km). No power or other development is present on site. Proven reserves from previously drilling are (based on 1978 reporting):

Central Zone: 4.301 MT of copper\*

Category: Drilled

Grade: 2.37 % Cu (cut off 0.7% Cu)

Ore Body Dimensions: 2000m along strike length, 60-150m thick, depth - from near surface)

Mineralization is vertically zoned: from 0 to 10-20m oxide (5% total); from 20 to 80-100m mixed (<7%); from 100m sulphides (87%).

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\* Reserve figure provided by Afghanistan Geological Survey from Aynak Copper feasibility study

Western Zone: 1.407 MT of copper\*

Category: Drilled

Grade: 1.61% Cu (cut off grade 0.4% Cu)

Ore Body Dimensions: 2000m strike length, 4 - 94m thick (the ore body is open to the north)

The mineralization is comfortably inter-bedded in sedimentary units of Vendian (Upper Proterozoic?) age and overlain by Upper Proterozoic volcanic and metamorphic rocks. Up to 150 m of sands and gravels overlie the deposit. The metallic mineral suite includes: sulphides: bornite – chalcopyrite (sphalerite, pentlandite, violarite, smaltite, linacite); and oxides: tenorite, brochantite, chalcantite, chrysocolla, malachite, azurite, cuprite, native copper

At this time, the Afghanistan Ministry of Mines and Industry (“the MMI”) of the Islamic Transitional Government of Afghanistan (“the Government”), will undertake, with assistance from qualified (i) mining and (ii) private banking experts, a tendering of the Aynak copper deposit.

#### **4. Scope of Work**

The scope of work is divided into three principal disciplines:

- Supervision and Interface to MMI
- Geologic compilation and preparation of data package
- Private banking assistance on the tendering process.

The tender program will execute in a series of staged activities:

- (i) field program including geologic data compilation, check mapping, check assays, preparation of a data package [by mining consultant];
- (ii) concurrent technical assistance to the Ministry of Mines and Industry, and other relevant ministries on pre-tendering considerations [by investment banker];
- (iii) preparation of terms and conditions for tender [by investment banker];
- (iv) solicitation of expressions of interest from the international mining community [by investment banker];
- (v) management of a data room for a one- month period for interested investors [by mining consultant and investment banker];
- (vi) orientation field trip for pre-qualified mining companies [by mining consultant];
- (vii) execution of a six-month due diligence period for pre-qualified mining companies [MMI with on-call of mining consultant and investment banker];
- (viii) Submission of Tenders [to MMI];
- (ix) Evaluation of tenders [by investment banker with MMI];
- (x) Mineral Development Agreement negotiations [by investment banker with MMI];
- (xi) Award of Concession to winning tender [MMI]

The tender schedule is to be determined.

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\* Reserve figure provided by Afghanistan Geological Survey from Aynak Copper feasibility study

#### Supervision and Interface to MMI

- Coordinate tasks outlined below;
- Liaise with investors and provide the interface to the MMI;
- Provide guidance within MMI and other relevant agencies (MoF, MoJ) on issues relating to privatization and tendering;
- Ensure ratification of the final tender contract.

#### Mining Consultant – Geologic Compilation and Data Package

- compilation of historic geologic information and drilling results (note: drill logs are available for all holes, although core has since been destroyed);
- limited regional, reconnaissance mapping (approx. 7 - 10 days) to confirm geology and distribution / extent of known copper prospects. All surface prospects should be located using geographic coordinates or UTM's, provided by a global positioning system. All geologic maps are to be captured digitally within MapInfo or ArcView GIS;
- limited confirmation of previous surface sampling through check assays (approx. 100 geochemical samples);
- translation of relevant historic information into English from Russian and possibly Dari;
- creation of poster boards, printed colored cross-sections and plan sections from drilling, geologic maps, drill logs, and other summary documents, in English, for use in a data room;
- creation of a distribution data set on CD;
- provide one qualified expert to conduct field tours to interested parties;
- staff one qualified expert in a data-room, in Dubai, for a period up to one month, and remain on-call to answer geology-related inquiries for a period of six months.

#### Investment Banker - Tendering Process

- provide a summary workshop and background documentation (in English and Dari) to the Ministry of Mines and Industry, and Ministry of Finance on tendering of mines and deposits;
- work with the Ministry of Mines and Industry, and Ministry of Finance, to define terms and conditions for tender of Aynak;
- prepare Terms and Conditions for tender of Aynak in English and Dari;
- define a tender schedule;
- solicit expressions of interest from the international mining community
- pre-qualify companies submitting expressions of interest;
- schedule / Manage Data Room activities
- schedule six-month due diligence programs for pre-qualified companies;
- work with the MMI to review tender submissions
- negotiate Mineral Development Agreement

### **5. Expected Outcomes and Deliverables**

#### Supervisor and Interface to MMI

- A clear understanding across all key government Ministries of the tendering process, management expectations, and ratification of final contractual agreements;
- Effective communication with interested investors on issues of concern;
- Accomplishment of all tasks on time and on budget.

#### Mining Consultant – Geologic Compilation and Data Package

- a dataset confirming geologic mapping, assaying, and regional extent of surface mineralization as reported by the 1973 – 1979 program;
- ground coordinates, in geographic coordinates or UTM's, for drill holes and surface prospects;
- a summary report of the field program;
- paper and digital cross sections and plan sections, and geologic maps in color;
- poster boards, summary documents, and digital datasets for distribution to interested parties;
- geological expertise available through (i) an orientation field trip to interested investors and (ii) on-call during the due diligence period.

#### Investment Banker - Tendering Process

- improved understanding of the tendering process at the MMI and associated Ministries;
- a set of Terms and Conditions for the tendering of Aynak;
- a list of pre-qualified companies having an expressed interest in Aynak;
- successful execution of a data room and due diligence period;
- successful negotiation of a Mineral Development Agreement.

Before departure the mining consultant will present their findings to MMI and invited participants to ensure that the final report represents the views of the Islamic Transitional Government of Afghanistan (ITGA).

## **6. Competency and Expertise Requirements**

### Supervisor

The selected supervisor should have the following skills and experience:

- +15 years experience in international mineral resource development and / or other major projects involving tendering processes;
- Strong liaison skills across governmental agencies in developing nations;
- A commanding presence with international investors, able to effectively answer inquiries and convey the intent and desires of the government;
- Good supervisory skills for data compilation and tendering processes
- Served as supervisor or team leader on at least two previous international tendering processes.
- Strong written and oral communication skills on tendering issues;

## Mining Consultant

The selected mining consultant should have the following skills and experience:

- +15 years experience in mineral property evaluation, including compilation of drilling results, deposit block modeling, engineering cost analysis, and geologic mapping / geochemical sampling;
- demonstrated skills in presenting large datasets in logical, well-organized formats;
- strong written and oral communication skills on technical mining issues;
- international mining experience in copper or other metallic mineral deposits;
- execution of field programs in developing nations;
- a minimum Ms in geoscience or M.Eng. in mining engineering, or equivalent. Certification as a professional geologist or mining engineer, and certified as a qualified person for reporting on mineral projects in Canada or Australia.
- a knowledge of Farsi or Dari would be considered an advantage

## Investment Banker - Tendering Process

- +15 years experience in investment banking, with a minimum of +5 years on mining projects;
- a demonstrated track-record in tendering of projects in the international arena;
- a demonstrated track-record in negotiating mineral development agreements;
- demonstrated contacts in the international mining community;
- strong written and oral communication skills;
- A knowledge of Farsi or Dari would be considered an advantage

## **7. Conduct of the Work**

All consultants assigned to the program will work under supervision of the MMI, in regular contact with the Ministry of Finance. They will adopt the highest professional and ethical standards during this assignment. A per diem for work in Afghanistan and Dubai will be provided.

## **8. Management and Reporting Requirements**

All reports, spreadsheets, and digital datasets should be made available to the MMI in electronic format before departure.



## APPENDIX G: ESTABLISHMENT OF A MINES CADASTRE OFFICE

1. **Project Title:** Establishment of a Mines Cadastre Office, Afghanistan

2. **Ref:**

### 3. **Introduction**

The Islamic Transitional Government of Afghanistan (“the Government”) is taking meaningful steps to exert hegemony over the mineral resources of Afghanistan; through a multi-phase program of regulatory and legal reform. As part of this program, the government is effecting institutional changes that will increase administrative efficiency and transparency, making Afghanistan a competitive member of the international mining community.

An essential step in this administrative reform is the establishment of a Mining Cadastre and associated support institutions, either within or apart from the Ministry of Mines and Industry (“the MMI”). These institutions will be charged with promoting, implementing and regulating private sector mining development. This is a significant step for the government, in that the current organizational structure of the MMI does not include such departments and full institutional capacity will have to be developed. Currently envisioned needs include:

- A Mining Cadastre – responsible for the recording, granting and cancellation of mineral rights and for making such records available to the public.
- A Mining Inspectorate – capable of monitoring and enforcing obligations of mineral rights-holders, will be established concurrently. The Inspectorate would also be responsible for auditing annual production at various locations, in support of royalty assessments.
- A Legal Department – established within the MMI to provide legal advice and to assist in negotiations, if applicable, with potential investors.
- Holding Companies – to increase the separation between the role of the state as “regulator” and its portfolio of shares in mining enterprises or mining joint venture interests. International best-practice often domiciles these holding companies within the Ministry of Finance.

The cornerstone of this reform is a new mining law that creates these institutions, clearly authorizes them to perform their respective functions, and determines how they will be funded. This provides for clear identification of the form and nature of mineral rights available to the private sector, and basic terms, procedures, and criteria for granting such rights. The end-result will be a competitive business environment that enables the government of Afghanistan to attract much needed private investment to grow the mining sector.

These Terms of Reference (ToR) concern the provision of a short-term contract for development of a Mining Cadastre, Minerals Audit Group, Legal Department and other function as deemed necessary. The program is principally centered on capacity development and technology transfer, with the institutions naturally evolving out of this process.

#### 4. Scope of Work

The scope of work is logically divided according to institutions to be created:

##### Mining Cadastre

- provide capacity development, within the MMI, on Mining Cadastre issues. Key topics may include (i) enforcement of the terms and conditions of exploration and mining rights, (ii) transparent administration of the granting of mineral licenses and concessions, (iii) developing schedules for progressive relinquishment of surface areas or upon abandonment of the mining title; (iv) ensuring timely processing of mining title applications; (v) clear, consistent, and transparent rules regarding mining title, and (vi) encouraging private sector investment;
- formal training of Mining Cadastre staff including standard operating procedures, reporting, and budgeting processes;
- establishment of the Mining Cadastre office, including sources of funding, development of physical property, supporting information technology, projected annual budget for three years and preparation of associated budget request documents;
- follow-up and on-call technical assistance.

##### Mining Inspectorate

- provide capacity development, within the MMI, on Mining Inspectorate issues. Key topics may include (i) procedures for monitoring and enforcing obligations of mineral rights-holders, (ii) performing regular audits of mineral production, by major commodity type, working with the Ministry of Finance on the period resolution of the production base to which royalties are assessed, (iii) coordination with the proposed Small-Miners Extension Service, and Quarry Extension Service on issues of mutual concern.
- formal training of Mining Inspectorate staff including standard operating procedures, reporting, and budgeting processes;
- establishment of the Mining Inspectorate office, including sources of funding, development of physical property, supporting information technology, projected annual budget for three years and preparation of associated budget request documents;
- follow-up and on-call technical assistance.

##### Mining Legal Department

- provide capacity development, within the MMI, on legal issues within the mining industry. Key topics may include: (i) ramifications and impacts of broader government laws to mineral tenure; (ii) ongoing monitoring of international best-practices on mineral development agreements; (iii) obligations of investors on environmental and social legacy issues, (iv) developing non-arbitrary, clear, and transparent enforcement of regulations; (v) reforms to sustain a competitive business environment.

- formal training of the Mining Legal Department staff including mining case-law, fair and just courts of law, protecting investor rights, standard operating procedures, reporting, and budgeting processes;
- establishment of the Mining Legal Department, including sources of funding, development of physical property, supporting information technology, projected annual budget for three years and preparation of associated budget request documents;
- follow-up and on-call technical assistance.

## 5. Expected Outcomes and Deliverables

### Mining Cadastre

- A clear understanding of the role of the state as regulator of mineral title;
- improved technical capacity within MMI on administrative issues relating to the administration of mineral title;
- workbooks and other training documentation;
- a clear, transparent, and non-arbitrary set of administrative protocols
- the physical assets of a Mine Cadastre office;
- a fully functional Mine Cadastre staff;
- a three-year budget plan;

### Mining Inspectorate

- a clear understanding of the role of the state as regulator of mineral production;
- a set of clear and transparent protocols for the monitoring and enforcement of mineral regulations and mineral audit procedures
- workbooks and other training documentation;
- a strong working relationship with the Ministry of Finance on royalty assessment and payment issues
- a strong working relationship with the proposed Small-Miners and Quarry extension services;
- the physical assets of a Mining Inspectorate Office;
- a fully functional Mines Inspectorate staff;
- a three-year budget plan

### Mining Legal Department

- a clear understanding of the role of the state as regulator with respect to legal obligations of all parties;
- improved technical capacity within MMI on the legal administration of mineral resources, including measures for the periodic assessment of the performance of the mining law and other legal statutes, and protocols for revision of laws;
- workbooks and other training documentation;
- the physical assets of a Mining Legal Department office;
- a fully functional Mining Legal staff;
- a three-year budget plan.

## **6. Competency and Expertise Requirements**

### Mining Cadastre

- a minimum of 10 years in the administration of a recognized mining cadastre unit;
- a demonstrated understanding of the role of the state as regulator;
- strong written and oral communication skills;
- capacity in long-range budgeting;
- a knowledge of Farsi or Dari would be considered an advantage

### Mining Inspectorate

- a minimum of 10 years as a mining inspector within a recognized mining inspector unit;
- a demonstrated understanding of the role of the state as inspector;
- strong written and oral communication skills;
- capacity in long-range budgeting;
- a knowledge of Farsi or Dari would be considered an advantage

### Mining Legal Department

- a minimum of 10 years as legal counsel on mining issues with recognized Ministries of Mines or other mineral regulatory bodies;
- a demonstrated understanding of international mineral law;
- strong written and oral communication skills;
- capacity in long-range budgeting;
- a knowledge of Farsi or Dari would be considered an advantage

## **7. Conduct of the Work**

All consultants assigned to the program will work under supervision of the MMI, in regular contact with the Ministry of Finance. They will adopt the highest professional and ethical standards during this assignment. A per diem for work in Afghanistan and Dubai will be provided.

## **8. Management and Reporting Requirements**

All reports, spreadsheets, and digital datasets should be made available to the MMI in electronic format before departure.

## APPENDIX H: A CORPORATIZATION PROGRAM FOR MINING ASSETS

### 1. **Project Title:** A Corporatization Program for Mining Assets in Afghanistan

### 2. **Ref:**

### 3. **Introduction**

The Islamic Transitional Government of Afghanistan (“the Government”) has undertaken, with assistance from the international donor community, a comprehensive analysis of the mining and minerals sector to:

- Implement new laws and regulations that exert hegemony over the mineral resources of Afghanistan and create a competitive investment climate for foreign direct investment;
- Institute a series of capacity development programs leading towards a clear, transparent, and non-arbitrary administration of mineral resources;
- Rebuild the physical assets and intellectual capacity of the Ministry of Mines and Industry and Afghanistan Geological Survey;
- Develop new institutions to improve regulatory capacity;
- Invite the international mining community to participate in the development of Afghanistan’s mineral resources;
- Involve the private sector in the above activities and development of the mineral resources of Afghanistan.

As a final step in this process, the Afghanistan Ministry of Mines and Industry (“the MMI”) will undertake a reform of state-owned enterprises to move them out from under direct command-and-control of the government. These Terms of Reference (ToR) concern the provision of a short-term, international specialist having experience in the translation of state-owned enterprises into commercial entities operating on a cash-flow basis.

### 4. **Scope of Work**

The scope of work is to:

- Assess current state-owned mining enterprises under the MMI, making a determination of financial performance and accounting practices;
- Work with various agencies of the government to determine institutional requirements, if any, for financial performance of these enterprises;
- Assess productivity, giving special attention to labor efficiencies and redundancies;
- Work with the Ministry of labor to define cohorts for retraining and/or redeployment to other sectors, including the cost of programs for retraining, redeployment, and / or early retirement packages;
- Work with enterprise managers to define a non-disruptive program of corporatization, including time lines and benchmarks;
- Create a corporatization plan.

### 5. **Expected Outcomes and Deliverables**

- A report assessing the financial performance and accounting practices of state-owned mining enterprises under the MMI;

- A summary of MMI, or other agency, institutional requirements for financial performance of these enterprises;
- An assessment of productivity, including labor efficiencies and redundancies;
- A definition of cohorts for retraining and / or redeployment to other sectors, including the estimated cost of programs for retraining, redeployment, and / or early retirement packages.
- A proposed program for corporatization, including time-lines and budgets.

#### **6. Competency and Expertise Requirements**

- a minimum of 10 years experience in financial analysis of state-owned companies in developing nations;
- a demonstrated understanding of the unique problems associated with corporatization of state-owned companies, either in extractive industries or more broadly in other sectors;
- strong written and oral communication skills;
- a knowledge of Farsi or Dari would be considered an advantage

#### **7. Conduct of the Work**

The consultant assigned to the program will work under supervision of the MMI, in regular contact with the Ministry of Finance. They will adopt the highest professional and ethical standards during this assignment. A per diem for work in Afghanistan and Dubai will be provided.

#### **8. Management and Reporting Requirements**

All reports, spreadsheets, and digital datasets should be made available to the MMI in electronic format before departure.

## ANNEX 8

### CURRENT MINERAL PRODUCTION

#### Coal Production

##### *Production and Value*

Very rough estimates of production and value exist for the coal sector. At present, it is estimated that about 110,000 – 140,000 metric tonnes are produced yearly: 1) from the state owned Karkak-Dudash mines in Baghlan province (30,000 tonnes) and the Sabzac mine in Herat province (10,000 tonnes); and, 2) 80,000 – 110,000 metric tonnes from informal artisanal producers at perhaps 10 mines in the country. The market value of this production is about US\$10 million in 2002.

The current production is slightly more than half of the levels reached in the 1980s when about 200,000 tonnes were produced at state owned mines. These mines employed 2,500 persons; at present employment in the coal sector is estimated at 1,000 persons, though the true number of small scale miners is not known. During the hostilities coal production never reached the level of 1978 of 213,000 tons. The production between 1980 and 1987 increased, however, quite steadily, from about 111,000 tons to 167,000 tons (Karkar Doodkush being the only mine in activity). By 1992 the production had dropped to 70,000 tons. The Ministry of Mines and Industries estimates that the country has minimum requirements of 500,000 tonnes per year which could increase to over 1 million tonnes. Additionally, 1-2 million tonnes could be used in the cement industry and an additional 3-4 million in the thermal power sector – if these two sub-sectors are developed.

Coal is used extensively in Afghanistan for domestic energy/heating (during the winter months) and industrial uses. The MMI sets a price of US\$44/tonne for sale of coal to government employees, which would apply to around 30,000 tonnes of coal supplied by government run operations (Kar Kar Dash). Kar Kar Dash coal ex-mine price is US\$40/tonne (Afg 2000) and transportation charges of private contractors is US\$17/tonne (Afg 850) or more, depending on the distance. This would imply an implicit subsidy to government employees of around US\$10/tonne, though this cannot be estimated precisely since proper cost accounting data are not kept. The free market price on the Kabul market is US\$ 60-80, which has increased dramatically in the past two years, from about the equivalent of US\$12/tonne, principally because of industrial demand to fire bricks used in reconstruction.

Based on field research, market surveys, and MMI information, the gross volume and value of coal production is estimated:

<u>Estimated gross value (2002) of coal production:</u>		
30,000 tonnes x US\$44/tonne	=	US\$1,320,000
110,000 tonnes x US\$80/tonne	=	US\$8,800,000

### ***Reserves***

Afghanistan is estimated to have over 70 million tons of reserves, most of which located in the region between Herat and Badashkan, in the northern part of the country. The most prospective areas occupy some 35000 sqkm along a discontinuous belt extending over 700 km from Darra-I-Farkar river in the East, to Kotal-I-Sabsak, in the West. The potentially economic coal deposits are found in the Lower and Middle Jurassic formations. They are generally complex in structure, have a variable thickness and discontinuous seams. The coal basins have been divided into districts, each with distinct technical characteristics.

Most of the reserves belong to the hard coals category (anthracite and bituminous coal). Mountainous terrain, long distances, infrastructure deficiencies and unfavorable logistics hinder the economic development of these reserves. However small-scale operations have been successful.

The two most important districts are: **Darrah-I-Suf and Sabjak**. Reserves (indicated) have been estimated at over 100 million tons. The coal is of high calorific value (7340 to 8250 cal/kg) and has a low ash content. At **Darwaza, Shabashak, Dahane Tor**, the deposits yield may be used for blast furnace. The other districts have resources in the order of 14 million tons of generally sub-economic quality and are structurally too complex.

#### Sabjak Coal District (Herat Province)

- Majit-I-Chubi deposit (Lower to Middle Jurassic Formations) 99.51 Mt – 175 meters total thickness – high in sulphur up to 38.6 % ash content

#### Darrah-I-Suf Coal District (Samangan Province)

- Shabashak deposit (Lower-Middle Jurassic Formations) 54 Mt – 40 meters total thickness – up to 32% ash content
- Darwaza deposit (Lower-Middle Jurassic Formations) 20 Mt (?) – 16 beds/3.6 m. thick each – 38.5 % ash content
- Dahane Tor deposit (Lower-Middle Jurassic Formations) 10 Mt(?) – 2 beds up to 13.5 m thick – up to 18% ash content
- Lela deposit (Lower-Middle Jurassic Formations) 15 beds up to 2.8 m. thick
- Sary-Asya deposit (Lower-Middle Jurassic Formations) 6 Mt – 14 beds up to 1.5 meters thick –



- Aspushta deposit (**Baghlan Province**) (Lower-Middle Jurassic Formations) 2.5 Mt (?) – 5 beds up to 3.8 m thick –

*Kar Kar Dod Dash Coal Enterprise (Baghlan Province)*

This coal enterprise comprises four coal deposits, all underground operations, at KarKar, Dukash, Ahimdarat, and Khurdara. The mines are located in central Baghlan province. The KarKar coal deposit was first developed in 1939 and has, over the years, received assistance from Czech, Indian, and Russian experts. At its prime, in the 1970s, the KarKar mine employed some 1,600 persons and produced 600-700 tonnes of coal per day. The four mines of the enterprise currently produce around 100 tonnes a day. Virtually no new capital investment has been made in the mines since 1988 and the equipment is in very dilapidated state. Presently, Kar Kar has 318 staff, most of whom live in the town of Pul-I-Kumyr. The enterprise produces around 30,000 tonnes per year, sold to cement and textile plants, bakeries, and the market in Kabul. The selling price of coal at the mine for large industrial users is set by the ministry at Afg 1,150 per tonne; for other uses Afg 2,000 per tonne. The official price of the coal delivered in Kabul is Afg 2,850 per tonne. The unofficial price in the bazaar is Afg 3,500 – 4,000 per tonne. It is thought that there could be good potential to identify additional reserves, since the area is only partially explored. The coals, in powdered form, have a calorific value of 4,500 Kg/Cal, ash 17-36%, and moisture of 2%. Seam thickness is between 2 and 14 meters.

***Rehabilitation Plans***

Government is planning to develop or rehabilitate several coal mines and has requested budget authorization to do so. These requests are now in search of donor funds.

The **Sabzak** mine (Heart Province) where Czech experts have carried out reconnaissance and production studies in the 1980's. The mine would supply coal to the western and Southern regions, as well as to the Heart cement factory (almost completed).

The Government also recommends (with the concurrence of UNIDO in its 1993 study) the rehabilitation of three mines in a first phase: (1) **Karkar Doodkash**, (2) **Ashpushta**, (3) **Dara – I- Suf**. The main argument being that all three mines could be rehabilitated or brought into production in the shortest time and the lowest investment. That would ensure a quick impact on the regional economy.

***Preliminary Coal Assessment***

**Main producers at Baghlon and Bamyan.** On one the hand, Afghanistan appears to have extensive coal resources. On the other hand, little is known specifically of such resources, on which geological information is outdated. Respective surveys and assessment have not been conducted in several decades, and need to be undertaken urgently in order to determine the country's full production potential. However, Afghanistan has good operational technical staff for the existing mines, with some trained in Russia and Czechoslovakia, and most graduated from the Poli-Technical Institute of Kabul, under previous Russian assistance programs.

Coal is produced in various provinces. Six mines have been reviewed by Bank mining missions in three provinces (Baghlon, Bamyan and Nengerhar - Jalalabad), out of eleven main producers in the country, to examine their respective situations and issues. Several seams are being mined: with a thickness of 1-3 meter, relatively low calorific values of 5,200 - 5,500 calories, and ash contents in excess of 12 percent. There is concern because in Baghlon, at the deeper Karkar seams, methane gas has been identified. In fact, in 1962 and 1980, explosions occurred with totals loss of 220 miners. Some deposits are being mined as small underground mines by the Ministry of Mines, and some as artisanal mines by private entrepreneurs. So far these mines are providing coal for cooking and heating, and for textile, sugar and cement industries in Baghlon, Bamyan and the Kabul region. The coal production is also important because it enables to substitute for wood, and thus provide a tool to alleviate the progressively increasing desertification. It is worth noting that support timber is imported from Uzbekistan at US\$7.5 per unit. Additionally, coal from Uzbekistan can be found in the local market.

**Baghlon.** As summarized in table below, the main coal mines in Baghlon near Polkhumry had a total daily output of 410 tons during the 1970s. At present they are producing 104 tons daily at a cost of about 2,000 Afghans per ton, with 320 miners and a total workforce of 775. Total provincial annual coal production exceeded 200,000 tons, but now is down to about 40,000 tons. The reduction of production is because all mechanized equipment has worn out and was discontinued. The mines are presently manual pick and shovels operations, with the exception of old rails, railcars pushed by hand, and winzes which continue to hoist output along accessing inclines which range 120-320 meters with inclination of about 8-18 degrees. These mines have the clear potential to increase easily their production to the levels achieved during the 1970s, simply by replacing the equipment that was discontinued. They also have the potential to duplicate relatively easily such production levels, but would require previous geological surveys and assessments to update information on existing geological reserves. They also benefit from being interconnected to the power grid. It is also worth noting that previously a briquetting plant provided by French bilateral assistance was operating near Karkar and Dutkash.

<b>Baghlon Province – Mines near Polkhumry</b>									
<b>Mine</b>	<b>Now</b>	<b>1970s</b>	<b>Potential</b>	<b>Reserve Needed</b>	<b>Thick</b>	<b>Dip</b>	<b>Heat</b>	<b>Ash</b>	
	TPD	TPD	TPD	M. Tons	Meters	Degrees	Calories	%	
<b>Karkar</b>	56	230	300-400	2.4	2-3.5 & 2	0	5,500	19	Soft
<b>Dutkash</b>	28	120	100	1.2	Lens 20	0	5,500	19	Soft
<b>Ahandara</b>	12	30	80-150	0.9	1.2-1.5	6	5,229	22	Hard
<b>Khordara</b>	8	30	80-150	0.9	1.2-1.5	6	5,229	17-20	Hard
<b>Total</b>	104	410	560-800	5.4					

At Polkhumry coal is supplied to industries including cement with 850 workers, textile with 600 workers, bread with 200 workers, sugar with 150 workers and power with 1,250 workers on coal based units. These amount to about 3,000 persons, which including dependents would amount to 15,000 people. Coal is also supplied to Kabul with transport costs of about 500 Afghans per ton. Its market price in Kabul is about Afgh 4,000. The combined reserves along the Karkar-Dukash seams are estimated at 7.5 million tons.

**Bamyān.** As summarized in table below, the main coal mines in Bamyān near Oshprushda include the Klish and Doab operations. Mining is conducted privately in very rudimentary manner, and with difficult working conditions. Output could be increased significantly with the introduction of basic mining equipment and improved mining methods. At Klish daily output is down to 40 tons with 100 workers, but can easily be increased to 100 tons daily. The cost structure is similar to the mines at Baghlon. At Doab, daily production is about 30 tons. However, coal production is likely to be significantly under-reported, in terms of loaded trucks, and amount of load in each truck, with consequential reduced effect in fiscal payments, which is paid at Afgh 550 per ton. The mines are presently manual pick and shovels operations, with coal transport to the surface done by hand and only some isolated cases of hoisting with winzes.

Nevertheless, it is worth noting that the Klishp-Doab seams extend for some 18 kilometers along the river, and about 5 kilometers along the cross-section of the river. Additionally, they appear to be relatively shallow at a depth of 30-40 meters. These deposits have the clear potential to increase production to significant levels on basis of surface mining. However, such a course should be preceded by reserve and quality assessments, and market surveys to ensure levels of production that can be absorbed locally and regionally. In this context, by including the anticipated expansion of the cement industry, the annual domestic and regional market for coal is likely to be about 7-8 million tons.

<b>Bamyan Province – Mines near Oshprushda</b>									
<b>Mine</b>	<b>Now</b>	<b>Ent ry</b>	<b>Potential</b>	<b>Potential Reserve</b>	<b>Thick</b>	<b>Dip</b>	<b>Heat</b>	<b>Ash</b>	
	TPD	Met er	TPD	M. Tons	Meters	Degrees	Calories	%	
<b>Klish</b>	40	120	100		2.5	12-15	5,500	26	Soft
<b>Doap</b>	30	120	100		2.5	12-15	5,500	19	Soft
<b>Total</b>	70		200	200					

### **Salt Production**

Afghanistan presently imports salt from Pakistan and Iran. Yet, good deposits of salt exist in Heart and Balakh provinces. Historically, production of salt in Heart is reportedly 13,000 metric tonnes per year, though current production is not known. Some evidence exists that a government agency is in cooperation with an NGO to produce unspecified quantities of salt but Ministry of Mines officials have no further information. Additionally, there are unconfirmed reports of a private sector operator having opened a small salt mine.

Afghans consume, on average, two kilograms of salt per person per year. With a population base of 27 million people this would give a gross yearly consumption of 54,000,000 kilograms or 54,000 tonnes. The Kabul bazaar market price for unprocessed salt is Afg 8 - 20 per kilogram, giving a gross yearly market value of between Afg 432 – 1,080 million, or the equivalent of US\$8.6 – 21.6 million.

### **Gravel, Construction and Industrial Materials Production**

Building and construction material deposits in Afghanistan consist mainly of limestone, marble, sand and gravel and clay. Quarrying of limestone and marble for construction and cement has, and is currently occurring, in several areas notably in the Province of Badakshan, and deposits exist in the north-eastern area, in the east-central area around Kabul, in the central area north of Kandahar and in the far south. Sand and gravel deposits are quarried mainly in the far north and locally around Kabul. Clay deposits are located mainly in the central and western areas.

With the active reconstruction effort currently underway the construction materials sub-sector is booming. Fired bricks and hence the production of clays and coal to fire them has increased significantly. A number of quarries for sand, gravel and other construction materials have opened up. This sector has also attracted foreign companies, mainly Turkish, Iranian and Indian entrepreneurs. Major demand for sand and gravel is being driven by the planned construction of 3,000 kilometers of highway: Kabul-Kandahar, Kandahar-Heart, Kabul-Pakistan border. Around 3,600 m<sup>3</sup> of gravel and sand is used per

kilometer which, we calculate, costs around US\$40,000 per kilometer<sup>12</sup>. Thus, a total of nearly US\$120 million is being spent on these construction materials. It is unknown what, if any, royalty the government receives on the value of sand and gravel extracted. Most countries assess either a gross revenues or a units of production royalty on sand and gravel operations.

### **Gems and Ornamental Stone Production**

Afghanistan is one of the richest countries in the world for gem and semi-precious stones, including **aquamarines, emeralds, kunzite, lapis lazuli, rubies, tourmaline**, and spinels (balas rubies). Gemstones are exploited by artisanal and small scale miners, principally in the Panjsher valley to the northeast of the capital Kabul and at Jegdalek, to its Southeast.

The major exploitation areas are:

a) The Panjsher valley where emeralds have been mined since approximately 1985. The deposits are exploited by the villagers of Khenj in mining areas known as Darkhenj, Mikeni, Butak, Buzmal, Bakhi and Darun. The mines are at high altitude (sometimes 4,000+ meters), using dangerous exploitation techniques, and hampered by presence of landmines frequently scattered in the areas. The quality of the emeralds is high, comparable to the best production of the Muzo mine in Columbia. 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.

b) Jegdalek ruby mines, located about 100 km east of Kabul near the Jalalabad. The ruby crystals range from a light purple-red to a deep 'pigeon's blood' red; good quality stones are about five carats. The deposits could be large; ownership and political control is similar to the Panjsher emerald mines.

c) Nuristan, very inaccessible, but having pegmatite hosted deposits of tourmaline, kunzite, aquamarine, spodumene and beryl. 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. The known villages are Mawi, Suraj (the two which seem to be the most productive), Nilaw, and Korgal.

d) Sar-e-Sang lapis lazuli mines located in Badakhshan in Northeast Afghanistan. Exploitation of lapis lazuli dates back to at least 5,000 BC making these mines arguably the oldest mines in the world. Production is still good and there is inventory available. One possibility of increasing value added from the lapis lazuli trade is to establish a cutting operation in Afghanistan to cut and polish the stones into objects of art. This could not only add value to the mineral resource but also provide employment for many persons.

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<sup>12</sup> Of the total of 6,120 M3 of sand and gravel consumed per line kilometer, about 60% is for newly purchased material (the remainder is re-cycled old material). Of the 3,672 newly purchased material, 80% costs US\$ 10 per M3, 20% an average of US\$ 17.50. This yields an average cost of US\$ 40,000 per line kilometer in purchases of new sand and gravel supplied from quarries established along the route.



As with the case of other mineral resources, exploitation of gemstones has been hindered by continued political turbulence. Nonetheless, some sources estimates that before the Taliban war the annual production of emeralds in the Panjsher valley alone was worth \$10 million and that some 5,000 villagers were engaged in emerald mining. The vast majority of the gems are exported to Pakistan where they are cut, polished, and sold to foreign markets. Afghanistan thus fails to capture the value added of this activity. Estimated current value of production for each producing area is as follows:

Value of Afghanistan Gemstone Production  
Estimate 2002

Area	Estimated Value in US\$
Panjsher	2,000,000*
Jegdalek	100,000
Nuristan	150,000
Sar-e-Sang	500,000

\*Production has decreased in Panjsher since 1995 due lack of manpower, inappropriate mining techniques, and dangerous conditions.

## POTENTIAL MINERAL DEPOSITS

### Copper Potential

The main concentrations of copper mineralisation occur along a 600 km belt located in the Kabul-Loghar province. The copper mineralisation is associated with Vendian (Upper Proterozoic) age inshore marine carbonates and fine detrital sediments. The mineralisation is considered synsedimentary and closely related to the similar aged deposits in southern Congo and Zambia and consists primarily of bornite and chalcopyrite along with trace amounts of other base metals.

Mineral evaluation work conducted by Afghan and Soviet geologists has defined three main deposits with the belt: Aynak, Jawkhar and Darband.

The **Aynak** copper deposit, located in the Loghar Province, constitutes the largest deposit with a declared<sup>13</sup> estimated reserve of 240 million tons grading 2.3% Cu. The mineralisation is contained in arkosic sandstone horizons interbedded in dolomitic beds overlying the crystalline basement. The mineralisation occurs as disseminations, small lenses and veinlets of bornite and chalcopyrite.

<sup>13</sup> Economic and Social Commission for Asia and the Pacific (ESCAP), 1995, Geology and mineral resources of Afghanistan: New York, United Nations, Atlas of Mineral Resources of the ESCAP Region, v. 12, 85 p.

With its declared reserves, the Aynak deposit constitutes a world class resource which should attract the interest of major mining companies.

The **Darland** copper deposit is located in the Kabul province. Mineralisation has been traced for 7 km in silicified micaceous marblized limestone with intercalated biotite-amphibolite schist. A estimated resource of 1 million tonnes of copper has been assigned to the deposit.

The Jawkhar copper deposit is located in the Kabul Province along the same belt as the Aynak deposit. Copper mineralisation is found in metamorphosed carbonate rich sediments.

Further concentrations of copper mineralisation have been evaluated in the Provinces of Herat (Shaida deposit – 4.8 million tonnes @ 1.1% Cu) and Zabul (Kundalyan copper – gold deposits). A further 143 showings of copper mineralisation have been recorded in deposits types ranging from veins, skarns, massive sulfides and porphyries.

### **Iron Potential**

The major iron ore deposits in Afghanistan are associated with Proterozoic sedimentary and volcanic formations and form a semi-continuous belt over 700 km long extending from Herat in the west to the Panjsher River in the east. They lie conformably within these formations where they occur as pods and lenticular bodies of hematite, magnetite, siderite and minor amounts of sulphide. The **Hajigak** deposit, located in Baghlan Province is the largest and best evaluated of the group. It reportedly contains an indicated reserve of 110 million tonnes at an average grade of 61.3 % Fe, making it the largest in the Middle East.

Further iron ore resources have been defined in the Bamyan (**Khaish** 117 MT @ 48.62% Fe), Badakhsham (**Furmarah** 35 MT @ +/-55% Fe )and Kapisa (Nukra-**Khana**) Provinces. These are of interest but do not have the same potential as the Hajigak deposit.

The composition of the iron ore and the fact it lies conformably with Proterozoic age sediments and volcanics would indicate that these deposits belong to the Banded Iron Formation group and are therefore similar to major iron ore deposits found elsewhere in the world.

### **Gold Potential**

The majority of the gold occurrences and deposits in Afghanistan are located in the Takhar, Badakhshan and Ghasni Provinces in the north of the country. These comprise approximately 95 lode and five alluvial deposits. The lode deposits are relatively small and associated with intrusive bodies.

The **Samty** deposit located in the Takhar Province is the most important alluvial gold placer. It reportedly represents an estimated contained gold content of 20 to 25 tonnes.



The presence of thick overburden (>20m) over the gold bearing horizons however represents a strong disincentive to economic development.

### **Cement and Dimension Stone Potential**

Because of its geologic history, Afghanistan is richly endowed in limestone, which locally has been transformed into marble by the intense tectonic processes that accompanied the creation of the Himalayan mountain chain in the eastern part of the country.

Limestone is quarried in several locations for cement and building stone. The larger deposits are in Badakhshan Province, notably the Jamarchi-Bolo, Sabz and Bakunvij quarries. The estimated limestone reserves for these quarries is reportedly in the several hundred million cubic metres.

Marble is quarried as dimension stone and as cement factory feed. The largest reported quarries are the Bini-Kama marble deposit in the Province of Badakhshan where marble outcrops over an area of 2 km<sup>2</sup> and to which a speculative reserve<sup>14</sup> of 500,000,000 m<sup>3</sup> has been given, the Mayden in Mayden Province deposit which has been under exploitation for over 30 years and the Kariz-Amir deposit in Kabul Province.

### **Industrial Minerals Potential**

The systematic geological mapping and mineral exploration programmes conducted by the Afghan and Soviet geologists defined 187 occurrences of non-metallic industrial minerals used in the chemical, fertilizer, refractory, glass, ceramic, construction and other industries. The main minerals involved are sulphur, fluorite, barite, celestite, apatite and phosphorite. Other relevant materials such as kaolin, silica sand, refractory clays, talc, magnesite and graphite are known to occur locally in significant quantities.

Building and construction material deposits in Afghanistan consist mainly of limestone, marble, sand and gravel and clay. Quarrying of limestone and marble for construction and cement has, and is currently occurring, in several areas notably in the Province of Badakhshan, and deposits exist where marble outcrops over an area of 2 km<sup>2</sup>. A speculative reserve<sup>15</sup> of 500,000,000 m<sup>3</sup> has been given for this deposit. Known deposits of limestone and marble exist in the north-eastern area, in the east-central area around Kabul, in the central area north of Kandahar and in the far south.

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<sup>14</sup> Economic and Social Commission for Asia and the Pacific (ESCAP), 1995, Geology and mineral resources of Afghanistan: New York, United Nations, Atlas of Mineral Resources of the ESCAP Region, v. 12, 85 p.

<sup>15</sup> Economic and Social Commission for Asia and the Pacific (ESCAP), 1995, Geology and mineral resources of Afghanistan: New York, United Nations, Atlas of Mineral Resources of the ESCAP Region, v. 12, 85 p.

Sand and gravel deposits are quarried mainly in the far north and locally around Kabul. Clay deposits are located mainly in the central and western areas.

Further large deposits of marble have, or are been quarried very close to Kabul and in the Maydan Province, approximately 40 to the east of the capital. Because of its geologic history, Afghanistan is richly endowed in limestone, which locally has been transformed into marble by the intense tectonic processes that accompanied the creation of the Himalayan mountain chain in the eastern part of the country.

Clay is mined for the production of bricks in several areas in Afghanistan, notably from the Karukh and Malumat deposits in the western Province of Herat, from the Surkhab and Kaukpar deposits in the Province of Baglan and from the Dahane-Tor and Shabashak deposits in the Province of Samanghan Province. Both these latter provinces are located in North-central Afghanistan.

Table of major industrial mineral deposits in Afghanistan (ESCAP 1995)

Area/deposit/province	Major mineral commodity	Reserves	Grade	Remarks
Alburz, Balk Province	Sulphur	200 Tt	40% S	Speculative reserves
Sanglich, Badakshan Province	Sulphur	250 Tt		Speculative reserves
Gugit, Bamyan Province	Sulphur	NA		Proven reserves
Badhud, Ouzgan Province	Fluorite	8.8 Mt		Speculative reserves
Sangilyan, Herat Province	Barite	1.49 Mt	85% Ba	Mined in past
Farenjal, Parwan Province	Barite	150 Tt	83.6% Ba	Speculative reserves 25 Tt Pb/Zn
Kartaw, Kunduz Province	Celestite	1 Mt	76.9% SrSO <sub>4</sub>	Speculative reserves
Tangi Murch, Banghlam Province	Celestite	85.6 Tt	54% SrSO <sub>4</sub>	Speculative reserves
Kotal-i-Sebzak, Herat Province	Phosphorite	NA	6.2-9.7% P <sub>2</sub> O <sub>5</sub>	
Loghgar, Loghgar Province	Asbestos	350 Tt	4.14-4.17% fiber	Measured reserves
Shodal, Paktya Province	Asbestos	1.5 Mt	0.23-39.4% fiber	Speculative reserves
Ghunday, Nangarhar Province	Talc	1.25 Tt	50-96% talc	Speculative reserves
Achin, Nangarhar Province	Talc	1.25 Tt	50-96% talc	Speculative reserves
	Magnesite	31.5 Mt	30-38% MgCO <sub>3</sub>	Speculative reserves
Songlinch, Badakhshan Province	Graphite	5 Tt	NA	
Istrombi, Badakhshan Province	Graphite	NA	50-69% C	
Dudkash, Baghlan Province	Gypsum	NA	99.57% gypsum	
Cha, Takhar Province	Gypsum	NA	NA	
Andkhai, Faryab Province	Halite	NA	87.2% NaCl	Artisanal mining
Dawlatabad, Faryab Province	Halite	NA	92.7% NaCl	Dry residue
Tashkurghan, Samanghan Province	Halite	NA	69-95.5% NaCl	
Jamarchi-Bolo, Badakhshan Province	Limestone, marl	6 km <sup>2</sup>	NA	Intermittent quarrying
Sabz, Badakhshan Province	Limestone	500 Mt		Speculative reserves
Badkunvij, Badakhshan Province	Limestone	NA	NA	Quarrying
Maydan, Maydan Province	Marble	Zone 1-12 km		Continuous exploitation for 30 years
Kariz Amir, Kabul Province	Marble	NA		Quarrying
Benosh Darrsh, Herat Province	Cement limestone	12,000 Mt	Cement Grade	
Darra-Chatagh, Herat Province	Limestone	1,000 Mt	Cement Grade	
Dul-i-Khumry, Baghlan Province	Limestone	>1,000 Mt	Cement Grade	Exploited
Bod-i-Sanjur, Herat Province	Limestone	NA	Cement Grade	
Jabel-us-araj, Parwan Province	Marble	NA	Cement Grade	
Topcha-khana, Topkar Province	Porcelain clay	3,000 m <sup>3</sup>	63.3% SiO <sub>2</sub> , 17.6% Al <sub>2</sub> O <sub>3</sub>	Speculative reserves up to 5m depth
Tala Barfak, Baghlan Province	Porcelain clay	100-150 Tt	NA	Speculative reserves
Kon-i-Alburtz, Balkh Province	Glass sand	110 Tt		
Rafak, Samanghan Province	Refractory clay	5m thick bed	NA	
Nalak, Baghlan Province	Refractory clay	13m thick bed	NA	
Talin, Baghlan Province	Refractory clay	385 Tt	NA	
Dudkash, Baghlan Province	Flux dolomite	3.9 thick bed	NA	
Bamyan, Bamyan Province	Dolomite	1 Mt	NA	Speculative reserves
Bamyan-1, Bamyan Province	Flux limestone	7.5 Mt	NA	Measured reserves
Hajigak, Bamyan Province	Flux limestone	3.5 Mt	49-54.7% CaCO <sub>3</sub>	
Farkhar, Takhar Province	Silica sand	NA	95.6-97.3% SiO <sub>2</sub>	
Hajigak, Bamyan Province	Silica flux	650 Tt	95.6-97.3% SiO <sub>2</sub>	
Dahane-Tor, Samanghan Province	Clay for bricks	NA		
Malmut, Herat Province	Clay for bricks	NA		
Sukhab, Baghlan Province	Clay for bricks	NA		
Kaukpar, Baghlan Province	Clay for bricks	NA		
Shabashak, Samanghan Province	Clay for bricks	NA		

Tt = Thousand tonnes, Mt = Million tonnes

## **ANNEX 9:**

### **TENDERING OF MINERAL PROPERTIES**

#### **Background**

The issue of whether or not to tender undeveloped mineral properties has been brought up by various government ministries. The tendering route is thought to provide greater transparency and possibly result in the government obtaining better terms and conditions from the investor. An overall government policy in this respect is all the more urgent since investors are beginning to show an interest in mineral deposits, in particular the Aynak copper deposit which has been extensively studied. The Chinese have expressed an interest in this deposit and senior Ministry officials have recently visited China. The present note summarizes some of the international experience with tendering of undeveloped mineral properties.

#### **Negative International Experience with Tendering**

While tendering for exploration and exploitation is used successfully in the petroleum industry, it has not been used with great success for undeveloped solid mineral deposits. There are a number of technical and commercial reasons for this, such as the nature of solid mineral deposits, long gestation and development periods for mines, delayed pay-back of funds invested, and specialized commercial and marketing considerations.

During the 1990s several countries of the former Soviet Union (Russia, Kazakhstan, Uzbekistan, and Turkmenistan, for example) attempted to tender their undeveloped mineral deposits. These efforts did not produce the results desired and many deposits remain either undeveloped or were subsequently given over to investors in one-off negotiations. The tender procedure for granting exploration and development rights has not been successful because it is more expensive and time consuming for investors, especially because many of the tenders demanded heavy up-front payments and investment commitments. Other countries, with codified and transparent mining title issuance procedures, were viewed as offering more attractive and expeditious investment conditions than those on offer in FSU countries. Thus, no significant mining country outside of the FSU has relied primarily on a tender procedure for granting solid mineral exploration and/or development rights.

#### **Positive International Experience with Tendering**

However, there are a few examples of countries which have successfully tendered undeveloped mineral properties. Very importantly, these were deposits where the

government had already conducted significant exploration and mineral reserves had been identified and/or proven. In Finland, for instance, the Government promotes exploration and development of a small number of carefully selected mineral properties by having the Geological Survey of Finland conduct extensive exploration and then putting them up for tender. However, investors can obtain licenses to explore for minerals in most parts of the country through an application process, without going through a tender. Peru is another country where undeveloped mineral properties have been successfully tendered. The key to the success of the tenders in both Finland and Peru is that they have been done on a highly selective basis as part of either a privatization program or a promotional program. Neither country has attempted to rely on tenders as the main procedure for granting mineral rights.

### **Tendering: the Case of Antamina in Peru**

The Peruvian government in the early 1970s nationalized the operating mines and mineral reserve holdings of the private companies then operating in Peru. These holdings were given to specific state owned mining enterprises or holding companies such as MineroPeru and Centromin. The Alberto Fujimori government reversed the previous policies of nationalism in the early 1990s. Under the new government an ambitious program of privatization of state owned enterprises was undertaken. MineroPeru and Centromin, with the advice of international advisors, sold off many mining assets, including a few highly prospective undeveloped or partially developed mineral properties. An example of a successful tender of an undeveloped mineral property is the case of Antamina.

The Antamina copper-zinc deposit was first identified by the Cerro de Pasco Corporation in the 1960s. The assets of the company were nationalized in 1974. In 1995/96 the Peruvian government, in accordance with the national program of privatization, decided to put out for international tender the Antamina deposit. At that time, a total of about 150 million tonnes of ore reserves had been identified; but, the government technicians believed that the deposit had considerable potential for greater reserves. Accordingly, an international tender procedure was devised which required a US\$ 20 million cash payment and an exploration program of US\$ 13.5 million. The winning bidder would have a two year option during which time the exploration program would take place and the reserves confirmed. At the end of the two year period the winning bidder could either confirm its bid, at which time the US\$ 20 million would be paid to the government, or walk away from the project. The US\$ 13.5 million commitment for new exploration was guaranteed by the company against a letter of credit. In the event that this amount was not spent in new exploration the remainder would be payable to the government. The property was awarded to the highest bid calculated according to a formula which took into account 100% of the up-front payment plus 30% of the investment commitment. The winning company was Rio Algom of Canada, later acquired by Billiton, which subsequently formed a joint venture with Noranda, Teck Corporation, and Mitsubishi. The mine has entered production in 2002 with a total investment of US\$ 2.2 billion. Antamina is one of the largest polymetallic mines in the world, producing concentrates with an equivalent metallic content of 270,000 tonnes of copper and 220,000

tonnes of zinc per year. The principal lesson to be drawn from the Antamina experience is to provide for a phased approach which will allow the investing company sufficient time to confirm existing reserve estimates and prove up new reserves. It should also be noted that significant reforms to the Peruvian mining law and regulations had been taken shortly before the privatization program. This provided the investor companies with sufficient security of tenure to mobilize international financing for the venture. Finally, Peru has an established “track record” in the mining industry. Companies, thus, felt more at ease investing in a known mining country than might be the case with a country an unknown track record and mining tradition.

### **Possibilities of Tendering Mineral Properties in Afghanistan**

We must have realistic expectations. Tendering of mineral properties has not been remarkably successful in countries new to the international mining scene, as has been the case of the former Soviet Union. However, in these instances, part of the problem may have been the heavy up-front commitment and payments demanded by the government, which the investors found excessive. Also, the fundamental legislation and legal environment of the countries were incomplete and/or inconsistent with international practice. Therefore, assuming that the Afghanistan government can make significant progress to put into place internationally acceptable mining legislation and an attractive overall fiscal package for mining, an attempt could be made to promote and/or tender the Aynak copper deposit.

There could be two alternative approaches to such a tender. Both have pluses and minuses. First, the government could attempt to tender Aynak itself, as the Peruvian government did with Antamina. However, there would be some concerns about the lack of capacity within the Afghanistan government to conduct such a tender, even if significant technical assistance were made available. A second alternative would be to engage the services of a reputable investment banking house. This would have some advantages of adding credibility to the tender effort, a significant consideration since Afghanistan is, in effect, unknown on the international mining capital markets. However, this route would be more expensive. Such a firms typically require a significant up-front fee to prepare the tender documents and conduct due diligence and a success fee in the event that the tender is successful. An initial first step for either alternative would be to prepare terms of reference to examine the possibilities of tendering Aynak and to come up with a concrete game plan. The consultancy assistance required for this could perhaps be funded through the ARTF and/or the design and feasibility studies unit.

## ANNEX 10

### IMPROVED GEOSCIENCE (SUPPLEMENTAL TO ANNEX 6)

#### Notes on Exploration Information and Afghanistan Geological Survey

##### *Coverage, extent and quality of existing geological information.*

The AGS headquarters in the east-central section of Kabul was visited by the mission team on several occasions to assess the coverage, extent and quality of existing geological and mining project information in Afghanistan. The maps and reports saved from the war represent reportedly 90% of the pre-war documents. These are stored in the new documentation centre on the fourth floor of the AGS headquarters in Kabul. The documentation consists of a set of four rooms recently restored with funds provided by the German GTZ aid agency. GTZ also provided two computers and printers be used to produce a registry of all the recovered reports once power is restored.

At the time of mission team's visit, AGS personnel were busy registering the reports into a hardcopy notebook. This involved assigning a catalogue number to the report along with its title, the year of its publication and name of the author. The main objective of this work was to produce a catalogue of the reports available at the AGS.

Of note is the fact the titles of the reports entered into the notebook are in three different scripts (Arabic, Cyrillic and Western) and in at least four different languages. Further, the registration did not include assigning a subject name or acronym for the different categories (e.g. general geology, mine assessment, pre- or feasibility report etc...) or keywords. The fact the entries are in different scripts will cause a problem when the digital capture of the reports begins, and the absence of subject names and keywords will seriously impede later searches for relevant reports.

In as far as the coverage, extent and quality of the of existing geological and mining project information in Afghanistan, the mission team was able to locate the following in the AGS documentation centre:

- the most interesting reports available in the AGS documentation centre, is the compilation, in English, of the geology and mineral resources of all Afghanistan put together by Sh. Abdullah and V.M. Chmyriov in 1980. It consists of two volumes: a complete compilation of the geology and tectonic history of Afghanistan (1184 pages) and a comprehensive review of the metallogeny of Afghanistan complete with summary descriptions of all the known mineral

occurrences in the country (729 pages). Two binders accompany the reports containing various maps (geologic, metallogenic, tectonic, principal mineral occurrences, etc...) and stratigraphic sections. Only one copy of the complete report is however still available at the AGS document centre and therefore cannot be taken from the AGS without special permission from the Minister.

- prospect and deposit reports on 110 selected sites where the Afghan and Soviet mineral evaluation teams conducted extensive work between 1960 and 1987. These reports contain detailed geological, geophysical and geochemical survey maps, along with the results of resource evaluation by pitting, trenching and drilling and in some cases adits. Among the geophysical techniques employed were noted: ground magnetics, IP, SP, EM, resistivity and radiometry. The survey is reported to have also had the capability of conducting gravimetric and seismic surveys. The prospect and deposit reports which were prepared in Russian are in the process of being catalogued and could only be partially examined;
- yearly progress reports on the regional geologic survey conducted by the German Geological Survey team in the years between 1959 and 1967 in the southern half of Afghanistan;
- a number of foreign publications are also available in the documentation centre including USGS reports.

A list of publications and reports on the geology and mineral resources of Afghanistan can be found hereunder.

#### **LIST OF PUBLICATIONS ON THE GEOLOGY AND MINERAL RESOURCES OF AFGHANISTAN**

Mineral resources of Afghanistan (2nd edition): Kabul, Afghanistan, Republic of Afghanistan Geological and Mineral Survey, 419 p. Abdullah, Sh., Chmyriov, V.M., Stazhilo-Alekseev, K.F., Dronov, V.I., Gannan, P.J., Rossovskiy, L.N., Kafarskiy, A.Kh., and Malyarov, E.P., 1977,

Les ressources d'hydrocarbures, de métaux et de substances utiles de l'Afghanistan: aperçu général: Chronique de la Recherche Minière, no. 460, p. 29-51, Afzali, H., 1981

Geology and mineral resources of the early Quaternary Khanneshin carbonatite volcano (southern Afghanistan): International Geology Review, v. 20, no. 3, p. 281-285 Alkaloids, V. Yu., Atakishiyev, Z.M., and Azimi, N.A., 1978.

System of structural and morphologic types of zones of rare-metal pegmatite veins and the potential for predicting deposits: Transactions (Doklady) of the U.S.S.R. Academy of Sciences: Earth Science Sections, v. 240, no. 1-6, p. 78-80, Bogatskiy, V.V., Rossovskiy, L.N., and Konovalenko, S.I., 1978,



Gemstones of Afghanistan: Tucson, Arizona, Geoscience Press, 220 p.  
Bowersox, G.W., and Chamberlin, B.E., 1995

Mineral resources of Afghanistan, in *Geology and Mineral Resources of Afghanistan*: Kabul, Afghanistan Department of Geological Survey, p. 44-85, Chmyriov, V.M., Stazhilo-Alekseev, K.F., Mirzad, S.H., Dronov, V.I., Kazikhani, A.R., Salah, A.S., and Teleshev, G.I., 1973.

*Geology and mineral resources of Afghanistan*: New York, United Nations, Atlas of Mineral Resources of the ESCAP Region, v. 12, 85 p. Economic and Social Commission for Asia and the Pacific (ESCAP), 1995.

Strata-bound low temperature Pb-Zn-Ba<sup>+</sup> or -F deposits in carbonate rocks of western Asia; geotectonic setting and main metallogenic features, in Wauschkuhn, A., Kluth, C., and Zimmermann, R.A., eds., *Syngeneses and epigenesis in the formation of mineral deposits*: Heidelberg, Germany, Springer-Verlag, p. 373-390, Jankovic, S., 1984,

The mineral industry of Afghanistan, in *Mineral Industries of Asia and the Pacific, 1990*: U.S. Bureau of Mines Minerals Yearbook-1990, v. III, p. 8-9, Kuo, C.S., 1992.

Geological setting of the emerald deposits, in Kazmi, A.H., and Snee, L.W., eds., *Emeralds of Pakistan; geology, gemology and genesis*: New York, Van Nostrand Reinhold Company and Geological Survey of Pakistan, p. 13-38, Lawrence, R.D., Kazmi, A.H., and Snee, L.W.,

*Mines and Mineral Occurrences of Afghanistan*, USGS Open-File Report 02-110, Orris, G.J. and Bliss, J.D., 2002,

Characteristics of the formation of a kunzite deposit in Afghanistan: *Soviet Geology and Geophysics*, v. 19, no. 11, p. 82-87, Rossovskii, L.N. (Rossovskiy, L.N.), Makagon, V.M., and Kuz'mina, T.M., 1978.

First find of pollucite and its crystals in Afghanistan: *Transactions (Doklady) of the U.S.S.R. Academy of Sciences: Earth Science Sections*, v. 236, no. 1-6, p. 157-160, Rossovskiy, L.N., 1977,.

Genetic relationship of aphanitic spodumene dikes to lithium-pegmatite veins: *Transactions (Doklady) of the U.S.S.R. Academy of Sciences: Earth Science Sections*, v. 226, no. 1-6, p. 170-172, Rossovskiy, L.N., Chmyrev, V.M., and Salakh, A.S., 1976,

Vertical range and zoning of spodumene pegmatite deposits in Afghanistan: *Transactions (Doklady) of the U.S.S.R. Academy of Sciences: Earth Science Sections*, v., 227, no. 1-6, p. 85-87, Rossovskiy, L.N., Chmyrev, V.M., and Salakh, A.S., 1976b,

Unique example of vertical geochemical zoning in pegmatites of the Hindu Kush, Afghanistan: *Transactions (Doklady) of the U.S.S.R. Academy of Sciences: Earth*

Science Sections, v. 240, no. 1-6, p. 204-206, Rossofskiy, L.N., and Shmakin, B.M., 1978.

Potash and other evaporite resources of Afghanistan: U.S. Geological Survey Open-File Report 75-89, 63 p, Shareq and others, 1977 [See Abdullah and others, 1977] Smith, G.I., 1975,

Lapis-lazuli from Sar-e-Sang, Badakhshan, Afghanistan: Gems and Gemology, v. 17, no. 4, p. 184-190, Wyart, Jean, Bariand, Pierre, and Filippi, Jean, 1981,

### **Geologic and metallogenic maps of Afghanistan**

Geologic Map of Afghanistan – Scale 1:2,500,000 – 1977 - Editors-in-Chief, Sh. Abdullah & V.M. Chmyriov. Compiled by V.I. Dronov, A. Kh. Kafarsky, K.F. Stazhilo-Aledseev, V.M. Chmyriov

Geologic Map of Afghanistan – (Scale 1:2,500,000) – 1997 -. Compiled by Wandrey, C.J. and Law, E.L.

Mineral Occurrence Map of Afghanistan – Scale 1:2,500,000 – 2002

Geology and Mineral Occurrences of Afghanistan, 1980, compiled by Sh. Abdullah & V.M. Chmyriov.

### **QUALITY OF GEO-INFORMATION AND “GAPS”**

The "existing database" at the AGS consists of a room with bookshelves full of reports, 1500 to 3000 according to differing accounts, one or two sets of geologic maps at a scale of 1:500,000 covering the whole country that have been pasted together and hung on walls, and a mineral occurrence and simplified geologic map at a scale of 1:2,500,000.

For all practical purposes this constitutes the existing database at the AGS. To "modernize" this database would require:

- creating a catalogue of the reports and maps including a primary and secondary subject, key works and a brief summary/description of the report along with a listing of the contained maps and tables. This would allow for future searches of the database search by subject or keyword.
- the digital capture using GIS software of all relevant maps on the geology and mineral occurrences of Afghanistan starting with the 1:500,000 maps which constitutes the largest scale, complete coverage of the entire country.
- Initiate site specific and regional geological and mineral resource evaluation studies to update the database.

It is important to note that at the present time, the AGS is totally unable to initiate any field activities for various reasons including:

- security considerations
- the lack of adequate vehicles, field equipment or standard geologic mapping tools (see annex 1 Preliminary assessment of AGS equipment requirements)
- the absence of any chemical, petrographic or mineralogic laboratory capabilities
- the absence of a team of professional and technical personnel trained in geological mapping and sample collection procedures.

It is important to take into consideration the fact that all AGS field operations ceased in the late 1980s and although the survey has approximately 100 professionals, these people need to be re-trained in basic geologic mapping skills. This training should include instruction in modern mapping techniques including the use of GIS as a mapping and spatial analysis tool. It is also uncertain as to how many of the professional staff are suitable to such retraining.

This does not mean that work could not be performed in the interim between the present and the time when the AGS is functional again as a geological survey. According to information received, all the original field maps and field notes were destroyed during the war. However, some of this information is contained in the reports on the evaluation of existing mineral occurrences and could be extracted from these reports. As the reports are in Russian this would require a translation and re-transcription of this information into site-outcrop description sheets which could be collated into a digital geo-referenced database. Estimated time for this work would be 12 man months. The work could be carried out by a team of 6 to 12 professionals with the necessary language skills.

Once the AGS has been restored to operational status in as far as personnel and equipment are concerned, and the security in all or at least large sections of the country has been reinstated, regional mapping should be re-initiated to provide an updated geological database for Afghanistan. This would include:

- mapping at a reasonable scale at which topographic maps are available such as 1:50,000 and compilation of this mapping into regional maps at agreed to scales (1:100,000 or 1:200,000)
- collection of a representative number of stream sediment and pan concentrate samples in the areas mapped (e.g. 2-3 stream sediment and 1-2 pan concentrate samples per km<sup>2</sup>)
- producing a compilation of all digital geo-referenced data including the outcrop description sheets described above, the aerial photography where available, any geophysical or geochemical surveys and all mineral occurrence data.
- production of a stratigraphic lexicon of the formations
- creation of a national collection of all the rock and mineral specimens found and used to create the stratigraphic lexicon
- creation of an digital geo-referenced archive of all geological information collected.

## **Order of magnitude costing to restore the field mapping capability of the AGS**

Restoration of the AGS building	\$500,000
Installing chemistry, mineralogy and petrography laboratory capabilities	\$2,000,000
Training of AGS staff in modern geologic mapping techniques	\$500,000
Re-equip the AGS so it can conduct mapping and sampling, though care should be taken to structure the equipment and reconstruction to suit the needs of private sector led growth, rather than the public sector approach of previous years	\$5,000,000

### ***Notes on Creation of Geo-Science Information Center***

As mentioned above, the present geo-science documentation and resource capabilities of the AGS are limited to the four rooms at the AGS headquarters that were refurbished by GTZ with bookshelves, desks, a computer and a printer. Ten days of training in GIS was supplied to the AGS professional staff at the time. Two engineers from the AGS received further training in GIS software and computer skills at the AIMS centre and are now being used by the Ministry of Mines to train staff in mainly Microsoft Office programs such as Word and Excel.

The AGS headquarters building, which was on the front line during the war and therefore sustained extensive damage and looting, is in the process of being rehabilitated. The looting included the stripping of all electrical wiring and laboratory equipment. The restoration process is advancing very slowly. Glass has been re-installed in a number of windows and the pocket holes created by bullets and rockets in outside walls have been re-filled. On the inside of the building, the majority of the rooms are still in a state of total disrepair and power has still not been re-instated. The creation of any real geo-science documentation and resource centre within the AGS will have to await the restoration of power within the structure.

It is however important that the AGS be given a mission as soon as possible to restore a feeling of purpose within the professional and technical staff.

Plans for the reconstruction and modernisation of the mining and oil/gas sectors have been proposed by the British and the United States geological surveys. While the USGS plans focuses on the assessment and promotion of Afghanistan oil and gas resources, the BGS plans involve the rehabilitation of the capability of AGS to function as a national geological survey.

The BGS plan is very complete and would involve institutional and capacity building at the AGS including the creation of a geo-information data centre. The BGS has suggested that Oracle® RDBMS be used to this end and that the principal application development tool be Oracle Application Server (Internet Development Suite / Forms & Reports).

The basic premise for the creation of a geo-science documentation and resource centre is the creation of framework which can include geologic and topographic map data, satellite imagery, aerial photography, accompanying databases, database documentation along with an efficient archival, retrieval and distribution mechanisms of this data.

In the case of data available at the AGS and that should be included into this framework, are:

- the data included in the prospect and deposit reports and which contain the results of detailed geological mapping, geophysical and geochemical surveying along with direct resource evaluation by pitting, trenching and drilling
- the available geologic maps which include maps at various scales prepared at various periods which comprise mainly the 1:500,000 country-wide geologic map, smaller scale compilations with or without mineral occurrence information and regional maps prepared by various parties including the Italians, the Germans and groups of Soviet and Afghan geologists.
- Topographic maps at differing scales produced by various groups at different periods. On the positive side, the AIM organisation in Afghanistan has gone a long way to harmonizing the topographic maps as to Datums and projections so they can be used with the minimal amount of fuss.
- Aerial photography at a scale of 1:30,000 and 1:60,000

### **Data Capture Methodology**

To be really useful in a modern sense, the data available at the AGS and in Afghanistan that pertains to mineral resources will have to be captured into digital format. Because the data is in different formats, data capture will involve different procedures.

Included in the prospect and deposit reports, along with the tables and the maps, is descriptive data in Russian that will have to be transcribed in summarized version into an English version mineral deposit fact sheet to be really useful. Standard mineral occurrence fact sheets have been prepared by a number of geological surveys. Any fact sheet used should include information about location, available infrastructure, geologic context, ore deposit modelling, ore deposit morphology, structure, ore grade and reserves by category, and metallic and non-metallic mineral associations.

The available geologic maps can be scanned, geo-referenced and captured digitally using GIS software such as ArcView or MapInfo. This requires a minimum amount of equipment such as a large scale scanner (A0), image processing software and large scale colour plotters (A0). Work should start with the small scale 1:2,500,000 country-wide maps and continue with larger and larger scale maps before moving to the prospect and deposit maps included in the prospect and deposit reports.

The prospect and deposit reports also contain geophysical and geochemical survey maps. These are in analogue form and will require digital capture to be really useful for spatial

analysis studies using modern gridding and image processing software such as Oasis-Geosoft software. If the data is in analogue format on maps, this work generally involves digitising the point data along the survey lines with the positional data. This work can be very tedious and long but can contribute greatly to the geo-science database. If the data is in table format with positional data, this data can be captured in digital format either using OCR software or by simply typing the results into a digital table using spreadsheet software such as Excel.

Aerial photography can be scanned and geo-referenced using the positioning information supplied generally with the picture.

### ***Data Storage, Viewing and Dissemination***

Storage, viewing, analysis and dissemination of the data information will probably require that a software package such as Oracle® RDBMS be used and that the principal application development tool be Oracle Application Server (Internet Development Suite / Forms & Reports). Oracle is a very high powered tool which will require quite a bit of training and hand holding. For the project to be a true success it is vital that the necessary IT skill be transferred over to the Afghan counterparts. On the other hand, Oracle is an extremely powerful tool and will allow for almost unlimited amounts of data to be integrated into the system.

Storage, viewing and dissemination of the spatial data will be done using the ArcView GIS software used to digitise it. Once in digital format it will be possible to use Internet Map Server (IMS) software. This will allow users to access the data using a simple Web browser. It will also allow users to integrate dataset information such a mineral occurrence information into the spatial data without requiring having GIS software.

## **PROMOTING MINERAL RESOURCES**

Promotion of mineral resources generally implies bring to the attention of potential investors opportunities in the country. These can vary from advanced prospects on which extensive work has been done to mineral occurrences in particularly interesting geologic and metallogenetic contexts with a minimal amount of evaluation work.

Several tested and proven methods exist to attract investors, these range from:

- the organisation of round tables to which investors are invited and at which presentations are made on the mining and investment codes;
- the presentation of papers on mineral resource potential at international conventions or symposiums such MIGA conventions, the PDAC and/or SEG/GSA by representatives of the Ministry of Mines or the Geological Survey;
- the organisation of a country stand at the above mentioned conventions
- the creation of a site on the Web with access to geologic and mineral resource data as well as mining and tax legislation;
- the purchase of a Country Supplement in the Mining Journal.

All these methods require that the mineral resource data be in a format that allows for distribution. At present, only a very limited number of geologic maps and mineral resource reports are available and most of those are in Russian.

### **Required Human and Logistical Resources**

Setting up a geo-science documentation and resource centre will require substantial amounts of institutional and capacity building within the AGS. This will involve training of a number of professionals and technicians in the science of spatial and information data capture and analysis over a number of years. It will also necessitate the purchase and installation of the hardware and software required to capture, analyse and reproduce the geo-spatial and information data.

The human resource talent pool should comprise a mix of at least a dozen professionals and technicians trained in spatial data capture, analysis and dissemination. On a practical level, this should involve training in word processing , spreadsheet, database, GIS and image processing software. Suggested software would include but not limited to: Word, Excel, Access, Oracle, ArcView, IMS, Erdas and Envi, as appropriate.

Hardware requirements for geo-science documentation and resource centres generally involve large storage capacity computers equipped with large screen monitors, inkjet colour and laser printers, large scale plotters (A0), and small scale (A4-A3) scanners and large capacity photocopy machines. Access to a large scale (A0) scanner is highly desirable.

Access to a broadband internet connection is also highly desirable.

### **Preliminary assessment of AGS equipment requirements**

#### **Geologic Mapping Equipment**

- Geologic picks
- Hand lenses (10X)
- Compasses
- Notebooks
- Magnets
- Colour charts
- Hardness measurement tools

#### **Data Compilation and Map Production Equipment**

- Computers
- Printers
- Plotters
- Scanners
- Software

### Petrography Lab

- Binocular microscopes (6x)
- Thin section preparation machine, equipment and supplies (slides, glue, polishing dusts, etc...)
- Polish section equipment (slides, holders, polishing dusts, etc...)
- Heavy liquids for mineral separation



## ANNEX 11: MINERALS PRODUCTION AND PRICES

**Selected Minerals Commodity Production and Price Estimates**

Commodity	2003 Planned Production	Current Estimated Production	Market Price US\$/unit	Est Current Value US\$ '000	Comments
Coal, metric tonnes	40,000	30,000	44	1,320	Reserved for government workers
Coal, metric tonnes		110,000	70 - 80	8,800	Open market, commercial prices
Salt, kilograms <sup>16</sup>	17,000	54,000,000	0.40	21,600	Annual consumption
Gypsum, tonnes	4,000				
Marble, tonnes	2,500				
Bricks, clay, 1000			70 -80		
Bricks, cement, unit			0.50		
Sand, 1 M3 <sup>17</sup>		500,000	30 - 36	15,000	Retail price, general const.
Gravel, quartz, 1 M3 <sup>18</sup>		440,640	19	8,372	New highway construction
Gravel, limestone, 1 M3	5,000	1,762,200	10	17,622	New highway construction
Gravel, other, 1 M3 <sup>19</sup>		500,000	12	6,000	General construction
Cement, 50 kg bag	30,000		130 - 150	3,900	
Gemstones <sup>20</sup>				2,750	
Total Estimated Value				85,364	

Source: Bank staff estimates based on market research, government statistics, and informed estimates

<sup>16</sup> Estimated national salt consumption, 90% of which is currently imported.

<sup>17</sup> Estimated annual production for general construction purposes.

<sup>18</sup> Estimates of quartz and limestone gravel purchases for 3,000 kilometers of new highways planned or under construction. The estimate of current production assumes that 600 kilometers of roads are to be built each year over the next five years, though it is not known how much of this construction takes place in one year.

<sup>19</sup> Estimated annual production for general construction purposes.

<sup>20</sup> Estimated market value; gemstones are clandestinely exported to Pakistan and elsewhere. Source: unpublished reports of Mr. Gary Bowersox.

## ANNEX 12: ESTIMATES OF ECONOMIC CONTRIBUTION NEXT FIVE YEARS

**Estimates of Economic Contribution: Mining Growth Scenarios Next Five Years**  
Value Amounts in US\$ million

Commodity	Investment Public (Total)	Investment Private (Total)	Production Volume (Year)	Production Value (Year)	Value Added (Year)	Royalties (Year)	Jobs persons (Year)	Export Balance (Year)
Coal	25.0	50.0	800,000 tons	40.0	8.0	0.800	1,500	NA
Quarries, road const.	0.4	10.0	2,160,000 m <sup>3</sup>	24.0	10.0	0.480	1,000	NA
Quarries, genrl. const.			3,000,000 m <sup>3</sup>	36.0	14.0	0.720	1,000	NA
Sand			1,000,000 m <sup>3</sup>	30.0	12.0	0.60	2,000	
Salt	0.2	1.0	54,000 tons	18.0	6.0	0.360	300	Import sub.
Gemstones	1.0	5.0	NA	5.0	2.5	0.100	500	4.0
Copper metal	50.0	240.0	50,000 tons	100.0	56.0	15.000	600	62.0
Handicrafts	0.5	2.0	NA	NA	NA	NA	NA	NA
Exploration	20.0	50.0	NA	NA	NA	NA	500	NA
<b>Totals</b>	<b>97.0</b>	<b>358.0</b>		<b>223.0</b>	<b>96.5</b>	<b>17.5</b>	<b>5,900</b>	<b>66.0</b>

## NOTES TO TABLE ON ECONOMIC CONTRIBUTION

**Coal estimates:** government investment are the budget requests by MMI for rehabilitation of the Sabzak and four other coal mines; private investment assumes that the coal mines, once rehabilitated, will attract additional private sector investment over the five year planning horizon of US\$ 50million; production volumes are those estimated by MMI to satisfy current and growing demand, a higher figure of 1 million metric tones per year could also be used; production value is calculated using a unit value of US\$ 50/per tonne, which around the current bazaar price in Kabul but taking into account some backsliding of price due to increased volumes on the market; value added is assumed to be 20% of total value; royalties are calculated on the basis of 2% of selling price, which is in line with international practice (if perhaps a bit low); employment is an estimate based on more efficient operations of the mines which would not require as much manpower as in previous years.

**Quarry materials, road construction:** sand and gravel are by far the most commonly exploited minerals produced at present in Afghanistan. Government investment is estimated at US\$ 0.400 to reflect set-up of a unit in the MMI to supervise these activities; private investment is estimated at US\$ 10million, reflecting the relatively inexpensive start-up costs of these types of operations; yearly production volumes are calculated on the basis of an average of 600 kilometers of new road construction per year (3,000 kilometers are currently planned for the next five years), with each line kilometer requiring 3,600 M3 of new quarry material; value of production is based on the current selling prices of gravels and sand as reported by the Ministry of Public Works; value added is assumed to be 40% of total production value; royalties are calculated on the basis of 2% of selling price; persons employed is an estimate.

**Quarry materials, general construction:** as the reconstruction effort gains speed, it is estimated that sand and gravel for general construction purposes will increase to about 3,000,000 M3 per annum; the selling cost of these materials is estimated at US\$ 12 M3, giving a annual production value of US\$ 36 million; value added is 40%, or US\$ 14 million; royalties assessed at the rate of 2% would yield US\$ 0.72 million; jobs on the order of 1,000 persons.

**Salt:** the MMI has requested budget support of US\$ 200,000 for development of salt deposits; an additional US\$ 1 million of private investment is probably required to bring one or more mines into production; production volumes (54,000 tonnes) are estimated on the basis of per capita consumption of salt; production values is based on volume multiplied by the current market price per kilogram (Afg 15/kilo = US\$ 0.34); value added is based on 30% of production value; royalties are 2% of production value; employment is estimated.

**Gemstones:** are currently produced in their raw state and the majority exported clandestinely to Pakistan where they are cut and polished. The objective is to regularize this production and offer incentives for cutting and polishing to take place in the local market. Government investment is basically to set up a special small scale mining unit with MMI and perhaps a pilot cutting and polishing school; private investment of US\$ 5 million is estimated to improve production techniques and put cutting and polishing onto a commercial footing; the production value is currently (2002) estimated at US\$ 2.75 million, however with up- grading of production methods and increased value added from cutting and polishing, it should be possible to increase the gross value of gemstones declared to the government to US\$ 5 million; the value added of the gemstones sector is estimated at 50% of total production value; royalties are based on 2% of production value; employment is estimated; export balance assumes that the vast majority of the production would be exported, thus the export balance figure is derived by subtracting the value of imported equipment from the value of production.

**Copper (Aynak):** the values here are from an actual mine under construction in Lao PDR, of similar size to that proposed at Aynak in Afghanistan. Obviously, the exact figures for production, taxes, and other will depend on the terms and conditions attached to the investment. It is also assumed that the government will have to invest in infrastructure for the mine.

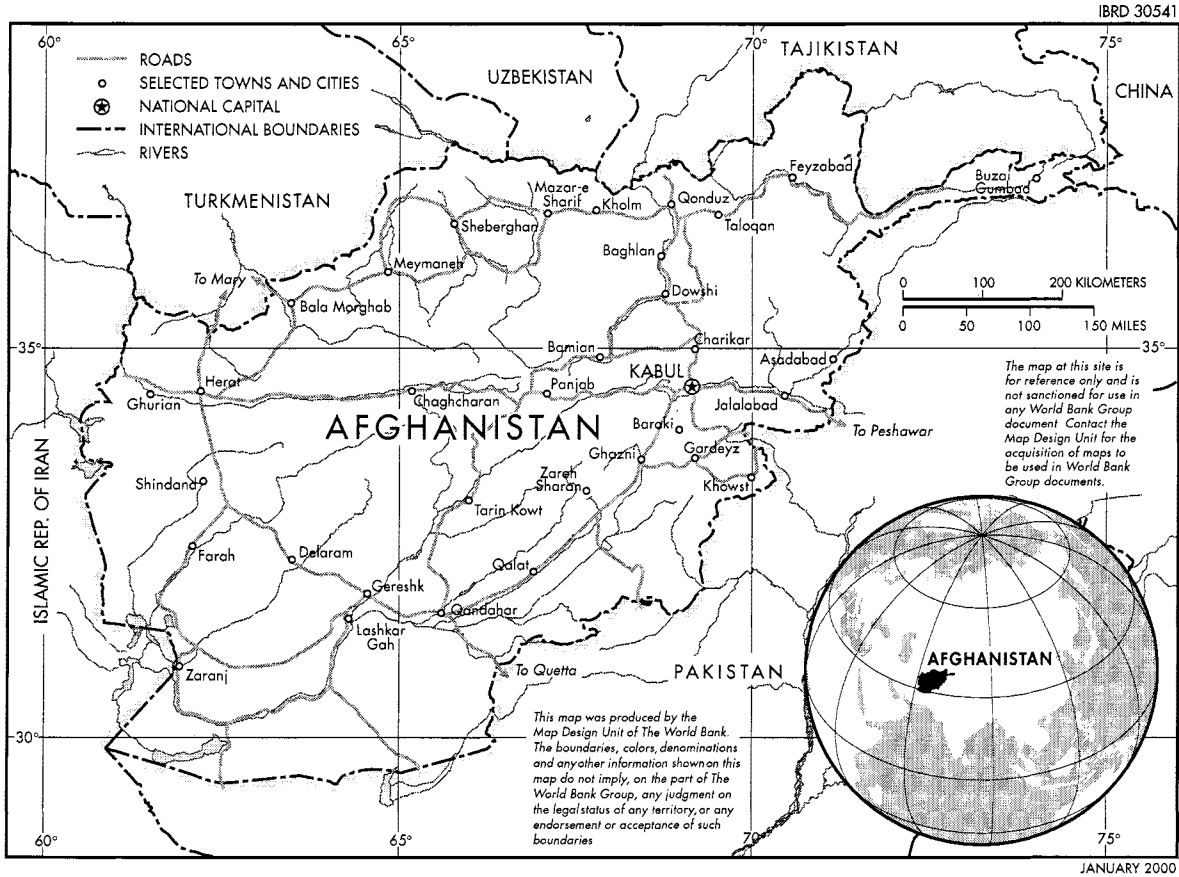
**Handicrafts:** some scope exists to establish a stone cutting handicrafts industry, based on some of Afghanistan's unique mineral specimens, such as lapis lazuli. It is difficult to estimate production values and other statistics of this production.

**Exploration:** government investment includes US\$ 20 million in grant funding from the UK and USA governments for the geological survey; private investment assumes that the security and other conditions will allow private companies to begin exploring in Afghanistan, which is here estimated to produce US\$ 15 million in year expenditures.

**Exploration:** The public investment figure combines the proposed interventions of grant funding from the UK and USA governments to assist with geological survey work in Afghanistan; assuming security and other conditions can be made attractive, the private exploration expenditure is based on US\$ 10 million average yearly, or a total of US\$ 50 million during five years, though this may be somewhat optimistic in the early years.

# ANNEX 13: MAPS

## General Map of Afghanistan



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