

SUSTAINABLE DEVELOPMENT OF MINING INDUSTRY IN THE FUJAIRAH EMIRATE, UAE

*Eng: Mohammed Abdul Haq
Research and Project Administrator
Mining Affairs Department
Fujairah Natural Resources Corporation*



الملتقى الدولي الثالث للصخور الصناعية والتعدين والمعرض المصاحب له -2015- EXPO, Industrial Rocks & MINING, Forum For
الإمارات - الفجيرة، دولة الإمارات العربية المتحدة
Emirate of Fujairah, United Arab Emirates

Introduction

- United Arab Emirates Located in Southwest Asia between $22^{\circ}30'$ and $26^{\circ}10'$ N latitude and between $51^{\circ}30'$ and $56^{\circ}25'$ E longitude, the United Arab Emirates (UAE) is a federation of seven Emirates :–
- Abu Dhabi, Dubai, Sharjah, Ras Al Khaimah, Fujairah, Ajman, and Umm al-Quwain.
- The UAE shares borders with Saudi Arabia in west, south and with Sultanate of Oman in east and north.

Fujairah is the only emirate facing the Gulf of Oman in the UAE's east instead of the Arabian Gulf. Located just outside the straits of Hormuz strategically on international trade routes. The emirate of Fujairah covers approximately 1580 Km² which is about 1.9 % of the total (83,600 Km²) of the UAE area. It is marked by a chain of rough and rugged mountains. The mountains occupy about 76% (1201 Km²) of the total surface area of the Fujairah emirate.

Rocks and Mining Sector

The emirate of Fujairah is bestowed with mineral wealth. The mining industry and related industries are major sources of revenue and is backbone of Fujairah economy. Fujairah Natural Resources Corporation (FNRC) is the custodian of the natural resources and exerts all efforts for the optimal exploitation of rocks and minerals for the industrial uses.

Presently there are 73 crushers producing aggregates and raw material for industry and construction sector. In addition to crushers there are 19 mining industry establishments involved in commercial activities related to rocks and minerals, such as cement, rock wool, ceramics, ready mix concrete, and sand washing units. The total sales from the crushers and quarries computed for the year 2014 was about 102 million Mt. Tons. Most of the material (about 65 %) was used within the country and about 20.5 million tons (about 20 %) was exported from Fujairah port to neighboring countries such as Qatar, Bahrain, Kuwait and India where as (about 15 %) was exported from RAK port.

Rock Crushing and Sand Washing Plant



Environmental Sustainability

In lines with the UAE government initiatives of “Green Growth” – economic growth with environmental sustainability - FNRC is committed for the sustainable development of the mining industry in Fujairah.

For sustainable development of the mining industry the most important factor is the protection of environment without jeopardizing the economic growth. The habitation in the vicinity of mining areas made it imperative to monitor the environment continuously and implement the environment protection regulations strictly.

FNRC is giving top priority to safe guard and maintain the environment as per international standards. The monitoring network is continuously upgraded in lines with the UAE federal and international regulations.

We are in process of acquiring and installation latest monitoring equipment which shall be installed at all quarry and crushers areas.

Inspection vehicles are being fitted with cameras and computers for Remote Monitoring and Inspection of quarries and crushers which will be connected to central monitoring base in FNRC head office.

Recently launched smart application 'Labaik' service is a step forward in this direction. The service embodies the country's strategic plan 2021 and the Fujairah emirate Master Plan 2040 with priorities of natural resources protection and sustainable development. The application available 24 hrs a day, is inter active and users friendly. Any environment issue or feedback can be reported by anybody through video or audio clip for immediate action by the concerned officials. It works within framework of information secrecy.

Resources Sustainability

Though mountains cover over 76% of total surface area of the Fujairah emirate, keeping in pace with safe environment and sustainable development, the mining activities are spread over 92 km² only, which is only about 7.6% of the total mountain area of the Fujairah emirate.

Traditionally Rock mining is being carried out throughout the mountain area of Fujairah and crushers are producing various grades of aggregate, and rock armours to meet the demands of fast growing cities within the country and the Gulf Co-operation Countries.

The materials are used in the construction of high rise buildings as well as in the continued expansion of the excellent road works and infrastructure.

In addition to building material the quarries produce raw material and stock feed for cement, ceramic, rock wool and iron / steel manufacturing.

FNRC is giving preference to establish rocks and mineral based industry instead of extraction of just raw material. The high purity limestone available in Fujairah is very attractive for investors for establishing value added calcinated lime industry.

There is vast commercial potential for such products within the country as well for export to neighbouring countries. UAE's annual import of calcium carbonate products is estimated to be more than 180,000 Tons, mainly from Iran, Jordan, Saudi Arabia, Egypt and Greece. Regional export opportunities exist for calcium carbonate products from UAE to India, Pakistan, Oman, Sri Lanka and other GCC countries. The annual import by India during the past few years was approximately 153,000 Tons of calcium carbonate worth about US \$ 21.00 million.

Industrial grade Limestone is widely used in industries such as, cement, ceramics, food and pharmaceuticals, animal feed, glass, plastic, rubber, agriculture, paint, paper, adhesives and sealants etc.

There is also a great potential for Dimension Stone industry in Fujairah emirate. Presently the UAE dimension stone industry relies on imported stone. The figures available for past years indicate that about 218,000 tons of dimension stone with a value of over US\$ 42 million were imported . The potential resources for dimension stone in Fujairah are in Tawiyeen and Habhab area Musandam group high purity limestone and the Ophiolite group rocks such as Gabbro, Dunite and Harzburgite around Fujairah.



Dimension Stone Resources



1- Limestone, Tawam



2- Limestone, Madinat, Tawam



3- Other Limestone Formations, Shakh, Dibba



4- Harburgite, Madinat, Dibba



5- Harburgite, Tawam



6- Harburgite, Madinat



7- Fujairah Gabbro, Fujairah



8- Fujairah Gabbro, Al Hayl



9- Lajarat Gabbro, Al Hayl



Fujairah Emirate, UAE
FNRC
Department of Mining Affairs
GIS Section

Base map constructed on
Universal Transverse Mercator
Projection World Geodetic System
Vertical Datum: Mean Sea Level

0 2,500 5,000 10,000 15,000 20,000 25,000 30,000
Meters 1:100,000

Legend
- area, forest
- Fujairah, Jumeirah
- major roads
- stream

Rock Type
- Marble (Dibba)
- Feldspar, calcite and basalt of chert, gabbro, and ultrabasic rocks
- Polished granite, gabbro, limestone with fossil remains
- Limestone with fossils, chert and longhorn corals
- Dolomite, argillaceous limestone and micaceous shale
- Limestone with calcite and calcite shell and other shells
- Gabbro and ultrabasic with various textures
- Quartzite / Quartzite
- Quartzite, Schists, with crystalline matrix and separate
- Chert / Limestone with granular and micaceous matrix
- Basic igneous and pyroclastic rocks with glassy structures of glass
- Quartzite

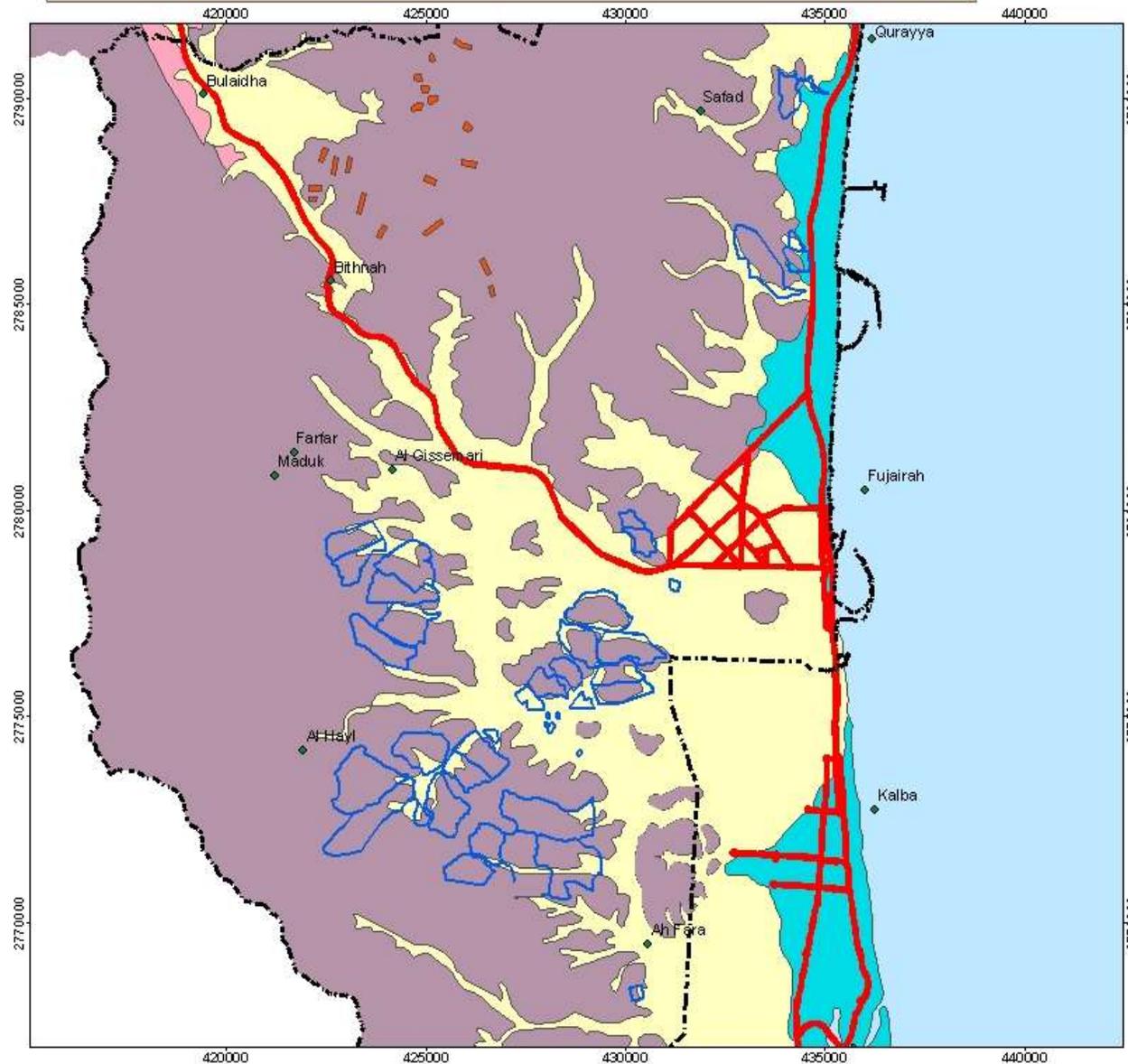
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The geological studies carried out by various consulting firms and the UAE Ministry of Energy indicates the presence of copper chromite, platinum group elements including gold and other precious minerals, in the Fujairah emirate.

Chromite is being mined at one location at present and the availability of chromite at other locations is also confirmed.

The presence of Platinum Group Elements (PGE) in the Fujairah Ophiolite complex is of great interest due to an increasingly broad range of applications in the automotive and industrial sector as well as in jewelry. The demand for PGE has grown steadily in recent years. This has resulted in an increase in the price of these metals, which makes the exploration of PGE and precious metals like gold, more lucrative. Comprehensive studies are required to assess the commercial viability of the exploration.

QUARRIES & CRUSHERS AT FUJAIRAH SECTOR (M1)



LEGEND

- Major Roads
- - - Fujairah Boundary
- International border

RockType

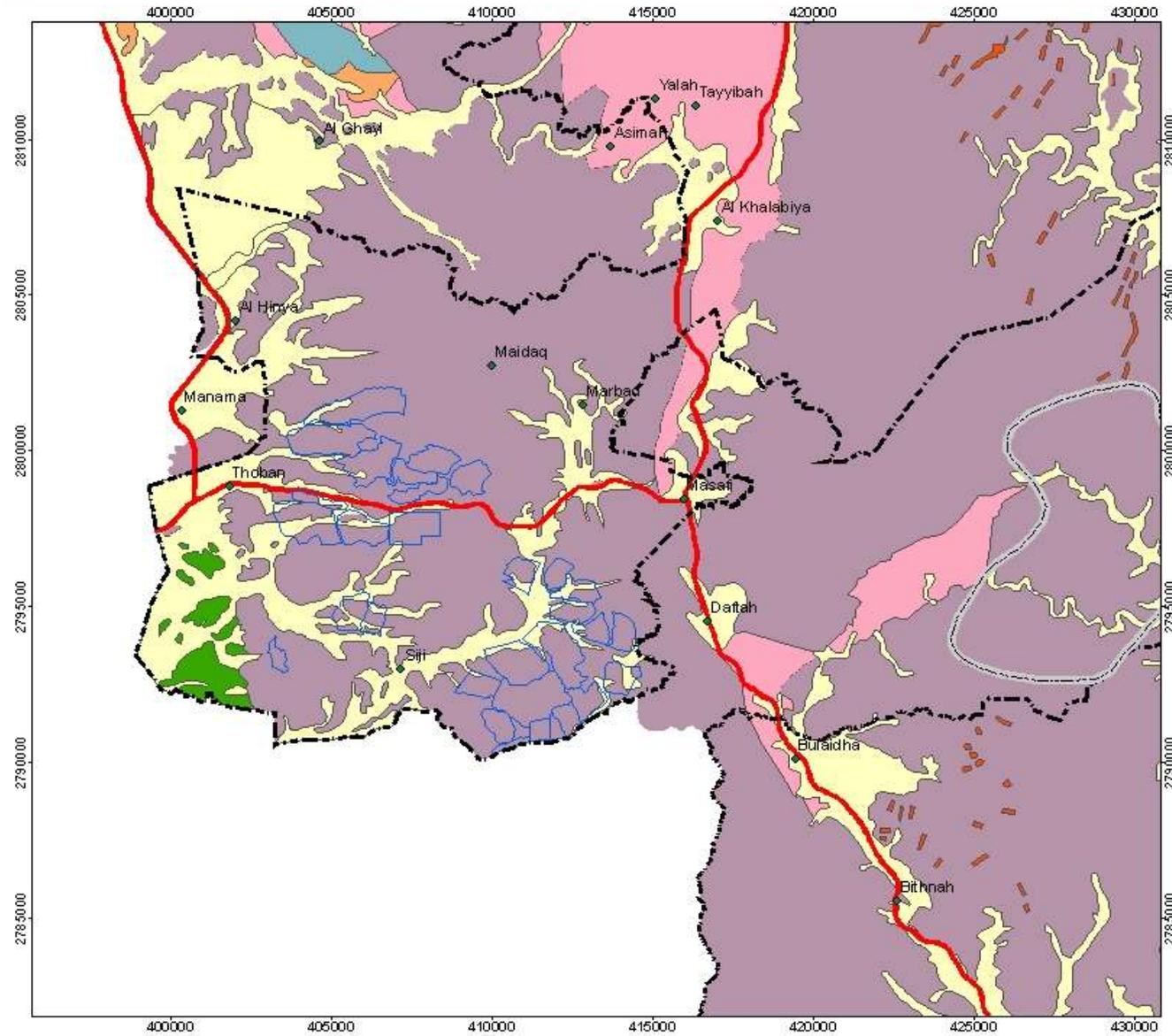
- Fluvialite Deposits
- Pebbles, cobbles and boulders of chert, gabbroic and ultrabasic rocks
- Fossiliferous, oolitic dolomitic Limestones with chert nodules
- Limestone with dolomite, chert and conglomerate
- Dolomitic argillaceous Limestone and occasional shale
- Limestone with dolomite, sandstone, marl and shales
- Gabbros and Ultrabasics with sheeted Diabase
- Granite / Granodiorite
- Quartzite, Schists, with crystalline marble and amphibolite
- Chert / Limestone with green/grey and maroon shales
- Basic vesicular and prophyritic lavas with pillow structures at places
- Coastal Sabkha
- Ocean

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Base map constructed on
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 Projection World Geodetic System
 Vertical Datum: Mean Sea Level



QUARRIES & CRUSHERS AT MIDDLE SECTOR (THOBAN & SIJI) (M2)



LEGEND

- Major Roads
- Fujairah Boundary
- International border

RockType

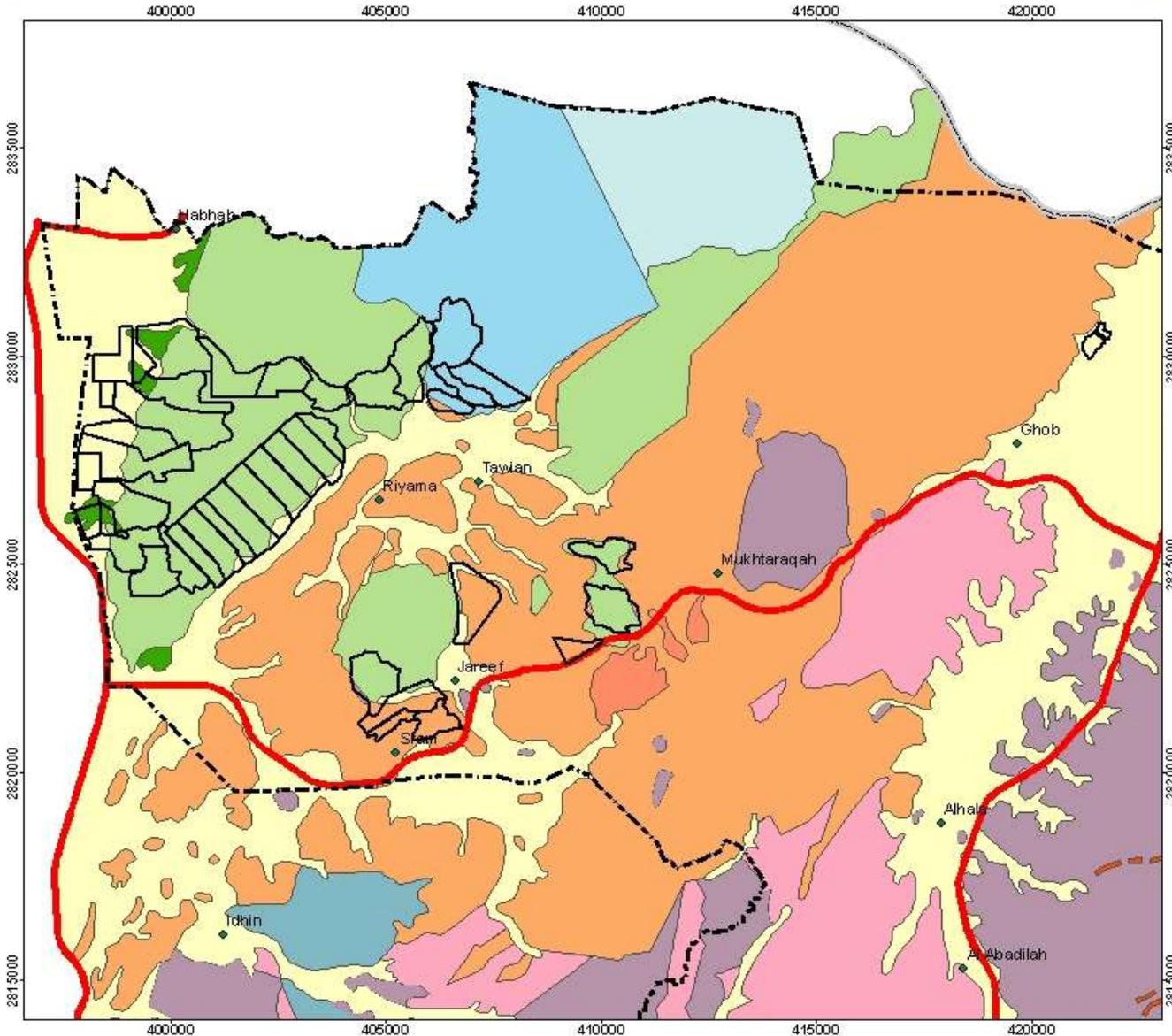
- Fluvial Deposits
- Pebbles, cobbles and boulders of chert, gabbroic and ultrabasic rocks
- Fossiliferous, oolitic dolomitic Limestones with chert nodules
- Limestone with dolomite, chert and conglomerate
- Dolomitic argillaceous Limestone and occasional shale
- Limestone with dolomite, sandstone, marl and shales
- Gabbros and Ultrabasics with sheeted Diabase
- Granite / Granodiorite
- Quartzite, Schists, with crystalline marble and amphibolite
- Chert / Limestone with green/grey and maroon shales
- Basic vesicular and prophyritic lavas with pillow structures at places

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Base map constructed on Universal Transverse Mercator Projection World Geodetic System Vertical Datum: Mean Sea Level



QUARRIES & CRUSHERS AT TWAIEEN & HABHAB SECTOR (M3)



LEGEND

- Major Roads
- - - Fujairah Boundary
- - - International border

RockType

- Fluviatile Deposits
- Pebbles, cobbles and boulders of chert, gabbroic and ultrabasic rocks
- Fossiliferous, oolitic dolomitic Limestones with chert nodules
- Limestone with dolomite, chert and conglomerate
- Dolomitic argillaceous Limestone and occasional shale
- Limestone with dolomite, sandstone, marl and shales
- Gabbros and Ultrabasics with sheeted Diabase
- Granite / Granodiorite
- Quartzite, Schists, with crystalline marble and amphibolite
- Chert / Limestone with green/grey and maroon shales
- Basic vesicular and prophyritic lavas with pillow structures at places

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References:-

- *UAE Ministry of Energy, "The Geology and Geophysics of the United Arab Emirates volume 10, volume 11 and volume 8, 2012."*
- *K.W. Glennie et al, "Geology of The Oman Mountains", 1974.*

Thank You