

The usage of hard unites of Mozduran Formation as a wall in Ardak dam (in Northwest of Mashhad)

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Abstract

Mozduran formation has known as of uppermost rock unites in Jurassic and begin of cretaceous period in Kopet-Dagh in northwest of Iran. This formation shows the high cliff in hard unites from Triassic to Neogen. The changes of depth and qualification of sedimentary basin causes cyclic forming of different sedimentary rocks like as marl, shale, limestone and sandstone. In Ardak area as reason of good morphology and qualification for forming barrier by using Kashafrood and Chaman-Bid formation rocks as of reservoir and base cliff limestone Mozduran as of wall Ardak barrier has been built.

Keywords: *hard unites, Mozduran, barrier*

Introduction

Geological study of Dam site is one of the most important steps in civil projects. Situation of Dam reservoirs in terms of morphology, permeability, chemical and physical pollutions and capacity. In addition, structure of Dams is as important as situation for Dam engineers (Stability, lithology, tectonic and geological formation). Ardak Dam located in the North-West of Mashhad (50 km). This Dam built on Chaman-Bid and Mozduran formations. We studied the application of rock units in this Dam.

Geological Setting

There is a series of parallel mountains in North of Kashfrod-Atrak graben. Trend of mountains is as same as folding. They called Kopet-Dagh and involved of different sediments like shale, sandstone and limestone. Chaman-Bid Formation consists of limestone, marl and shale which deposited over each other with 3 m width and several kilometers lengths. Mozduran Formation consists of limestone, shale and shaly limestone. It is constitute 1.8 percent of reservoir area.

Geology of Dam reservoir:

A- Geomorphology:

Dam reservoir situated in Chaman-Bid formation that formed core of Mian-Morgh anticlinal. The sediments involved marl and limy marl laminate. Effect of erosion on these sediments is more considerable than Mozduran Formation so, they seem like hills. In general, lithology of this area had strong affect on geomorphology of Dam area.

B- Lithostratigraphy

Based on researches, this field is located in Kopet-Dagh sedimentary basin. Kopet-Dagh sedimentary basin located in North of Khorasan and Turkmenistan. We see the Binalood

Mountain in the South, Tooran plate in the north and Eshghabad fault (310-315 degree) as a suture line (it separates Kopet-Dagh zone from Tooran plate).

As a sedimentary basin, Kopet-Dagh basin involved thick sedimentary layers (8000 m) without significant stratigraphic gap however; facies variation is considerable for geologists. From geological time scale view, sediments had been deposited from Jurassic to Miocene, it means after early Cimmerian orogenesis (collision between Iran and Tooran plates).

C- Tectonic:

However tectonic had main role in creation of geomorphologic structures of the field, lithology is as important as tectonic in terms of geomorphology determination.

As we mentioned, Ardak dam is located near core and southern limb of Mian-Morgh anticlinal.

Trend of anticline axis is NW-SE, layers dip in southern limb is 60° and for northern limb is 50°. Except this anticlinal, we do not see an important tectonic activity and structure like fault in reservoir area.

Conclusion

The results involve:

A- Calcareous units and shaly- lime unit of Chaman-Bid formation in the dam site cause suitable morphology and also low permeability for dam reservoir.

B- limestone, dolomite, shale and marn units of Mozduran formation cause stability in the wall rock and as a result it is suitable for making dam.

C- The big geological problem for engineers is fault in general, tectonic activity. In fact, faults cause a problem that we called it escape of water; now this problem to be solved in this area because of sedimentary units deposition. Chaman-Bid and Mozduran formation settle sequentially thus water can not carry out through at the layers easily.

References

- 1- Afshar Harb. A. 1373. Geology of Kopet-Dagh, Geological survey of Iran.
- 2- Geology of Iran, Darvish zadeh. A., Amir Kabir publishing, 961 pp
- 3- Geological report of Ardak Dam projects, Abpooy consulting engineers, 1378.