

The Application of Geophysical Methods in Identification of Subsurface Fractures in The Vicinity of a Poor Performance Percolation Tank

Irshad S Shaikh¹, Dr. Aayyed Haffiyuddin Badurrudin² Dr. P. L. Salve³

Assistant Geophysicist, Associate Professor Deputy Director
G.S.D.A. AURANGABAD, Maharashtra, India

ABSTRACT

Article Info

Volume 8, Issue 6

Page Number : 386-388

Publication Issue

November-December-2021

Article History

Accepted : 05 Dec 2021

Published : 16 Dec 2021

Percolation tanks are constructed to conserve the rainwater in large quantities and allow more infiltration in its area of influence. Sometimes due to heavy fracture concentration/thick weathered zone, the water in percolation tank migrates fast in short period and tank becomes dry, which leads to early scarcity conditions. The village karkatta of taluka and district Latur is one such village, where water is provided by constructing two wells in the vicinity of percolation tank. The water level in the percolation tank depletes fast and the tank becomes dry in early summer. Also one cement nala bandhara was constructed in the downstream of the nala. The village is funded by UNICEF to implement MUS (Multiple Water Users) project. The area is surveyed by applying both electrical resistivity methods and low frequency electromagnetic methods in submergence of tank as well as in the downstream of percolation tank. The studies reveal that the leakages are due to thick vesicular basalt followed by fractured massive basalt. Suitable remedial measures are recommended to slow down the subsurface flow so as to improve the performance of the percolation tank.

Keywords : Multiple Water Users (MUS) project PWS WELL

I. INTRODUCTION

The village Karkatta is situated on Murud-Latur road. The total population of the village is 1500 souls. UNICEF has taken up this village under Multiple Water Users (MUS) project to educate the villagers to utilize their natural resources judiciously. The village was mapped geologically and covered social aspects. The survey revealed

that the water supply is done by two PWS sources located due east of village in the vicinity of Percolation tank. One well was constructed under Jalswarajya scheme and another one under Piped Water Supply scheme. It is revealed that the water level in Percolation tank depletes fast and it becomes dry during summer. A surface structure in downstream of percolation tank was constructed

to reduce seepages. The area is referred for geophysical to locate fractures for sealing.

Topography and Geo-hydrological conditions:

The slope of the area is towards west. The area is covered by Deccan basalt. The sequence of the formation is thick over-burden is followed by poorly fractured basalt.

Geophysical Survey:

(i) Geophysical resistivity and electromagnetic surveys conducted covering two dugwells. (Plate 1) There are four VLF Profiles taken in north-south direction along cart track near PWS well. A prominent fracture is observed from 50 to 80 m length, which covers the dugwell of Shri. Kalidas Shinde. The width of the fracture is 30 m. (Plate 2). North of nala is devoid of fracture, where the PWS well of Karkatta and PWS well of Borgaon kale are located.

(ii) Four em profiles are taken in east west direction covering the new Jalswarajya well. From VLF profiles shallow inclined profiles are observed from 70 m to 140 m length. Another inclined fracture is observed from 0 to 50 m length in all profiles.

(iii) Vertical electrical sounding are conducted to confirm the depth of the fracture.

Observations:

1. The fracture observed on em profile shows that seepages are occurred southern side of nala connecting the Shri. Kalidas Shinde well. The dugwell of Shri. Kalidas Shinde located on vesicular basalt, which is acting as carrier through which percolation water leaking. The north of nala is covers hard massive basalt,

where PWS wells of Karkatta and Borgaon Kale is located.

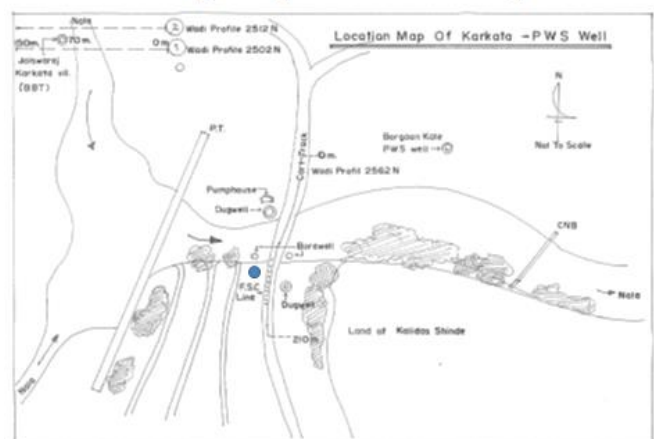
2. The minute fractures around Jalswarjya well is not inter connected. (As shown in em profiles).

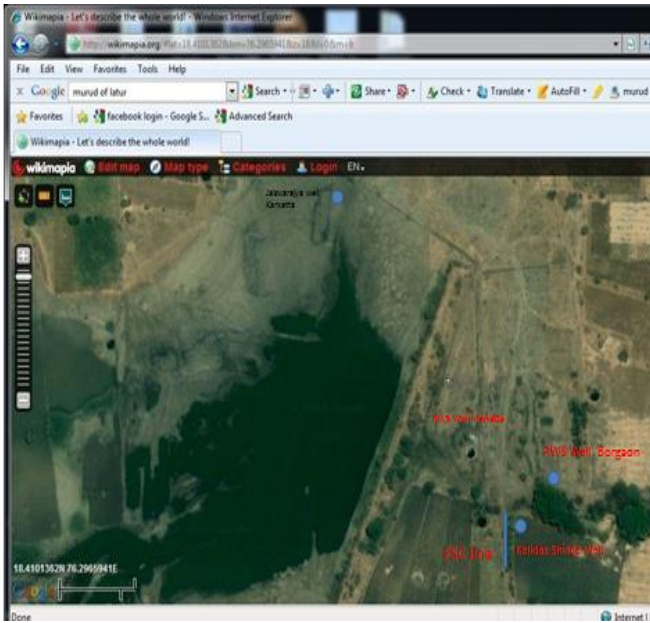
Recommendations:

1. Fracture Sealing Cementation (FSC) is recommended due east of Percolation tank to arrest the subsurface fractures so as to retain water in percolation tank.
2. Bore Blast Technique (BBT) is recommended around Jalswarajya well to increase the effective diameter of the well.

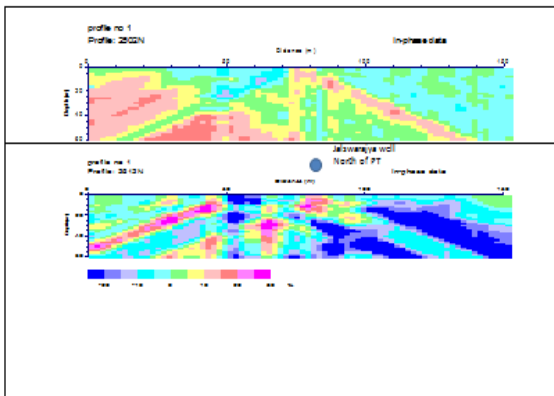
Results: FSC and BBT projects are implemented and the results are encouraging. The actual evaluation of results can be worked out only after completion of one Hydrological cycle.

Location map of Dugwell of Karkatta village

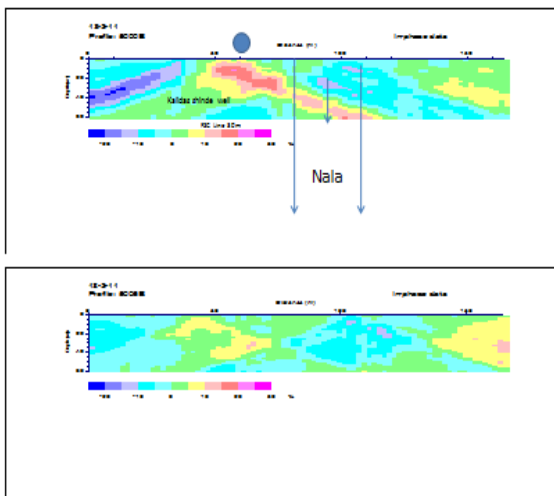




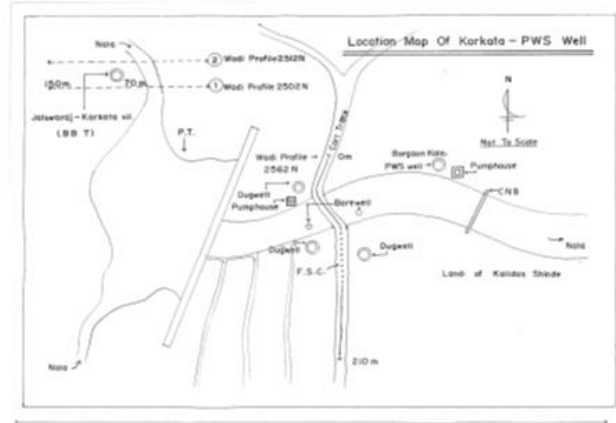
EM profile near Jalswarajya well (Northeast of PT)



EM profile in N-S direction across nala, near PWS well Down stream of PWS well



Recommendations



PWS well Village Bargaon kale

Dugwell in the land of Kalidas Shinde



Application of Geophysical Studies to locate subsurface fractures in the downstream of percolation tank

GEOPHYSICAL INVESTIGATIONS IN IDENTIFYING THE SUBSURFACE FRACTURES OF A PERCOLATION TANK

POOR PERFORMANCE OF A PERCOLATION TANK DUE TO HEAVY SUBSURFACE RUN OFF

GEOPHYSICAL METHODS FOR IDENTIFICATION OF SUBSURFACE FRACTURES IN SOLVING THE PROBLEMS OF A POOR PERFORMANCE PERCOLATION TANK

Cite this article as :

Irshad S Shaikh, Dr. Aayyed Haffiyuddin Badurrudin, Dr. P. L. Salve, "The Application of Geophysical Methods in Identification of Subsurface Fractures in The Vicinity of a Poor Performance Percolation Tank", International Journal of Scientific Research in Science and Technology (IJSRST), Online ISSN : 2395-602X, Print ISSN : 2395-6011, Volume 8 Issue 6, pp. 386-388, November–December 2021. Available at

doi: <https://doi.org/10.32628/IJSRST21864>

Journal URL : <https://ijsrst.com/IJSRST21864>

