



Development of Methods for Anti-filtration Formations Destruction Inside a Heap Leach Pile

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Abstract. This article discusses the new technical solutions that increase the restoration of the quality of pregnant solutions flowing out from the heap leach pile.

Keywords: Anti-filtration formations · Heap pile · Pipe · Sprinklers

1 Introduction

The presence of low permeable soils is one of the most difficult problems of metal extraction during heap leaching (Ozhogina et al. 2017; Vorobyov et al. 2017).

The development of new models will reduce the degree of their negative impact on the intensity of heap leach process.

2 Methods and Approaches

A wide range of methods were used for the current research: the analysis of the earlier conducted researches, the mathematical and physical simulation, determination of dependences, the calculations and the control, the experimental studies and measurements in accordance with the conventional standard.

For the experience, we used a section of a rectangular shaped heap leach pile 5×5 m size. We have installed an air injection pipe near a homogeneous low-permeable layer. Assuming that the bottom and sides are sealed to air leakage, we used the SVAirFlow software to simulate the air/oxygen flow through a uniform anti-filtration layer. In addition, the temperature inside the mass is constant and equal to 20 °C. The air supply pressure through the pipeline is 121 kPa, and the upper part has an atmospheric pressure of 101 kPa.

3 Results and Discussion

The results of the model are shown in Fig. 1. We've noticed that the air pressure in the whole low-permeable layer varied between 109 and 120 kPa. This means that the pores are slightly wider open.

The second technical solution, which also allows to increase the intensification of heap leach process is the displacement of spraying devices in the direction of weakly affected by technological solutions places.

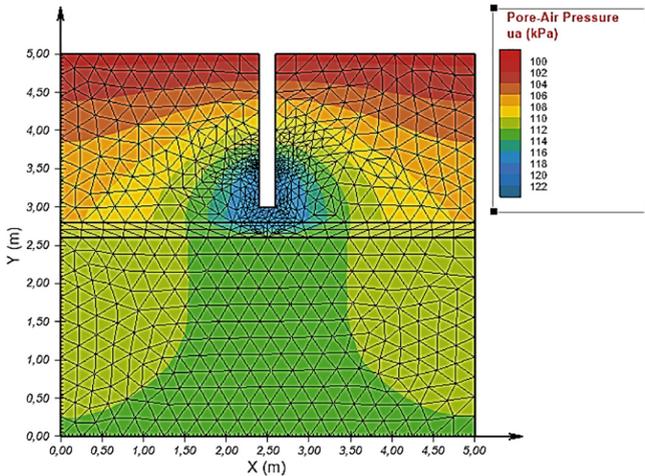


Fig. 1. Model showing the impact of injecting air/oxygen

4 Conclusions

According to our study results, we can conclude that supplying the air under much higher pressure than the atmospheric one in the places where anti-filtration layers are formed, along with the displacement of the sprinklers, will enhance more seepage of pregnant solutions through a heap leach pile.

References

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