EFFECT OF THE USE OF SLOW SAND FILTERSTOWARD DECREASING SALINITY LEVELS AT WELL AT GAMPONG UJONG BLANG SUB DISTRICT KUTABARO, ACEH BESAR

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ABSTRACT

The development of civilization as well as the increasing number of population inevitably add to fouling and contamination in the water. Water is a natural resource that circulates under the influence of the weather so there is something called " Hydrology Cycle ". This cycle is important becauseit issupplied inland water areas. The water will evaporate due to the heat of the sun. This evaporation occurs in surface water, which is in the upper soil layers (transpiration, respiration). Water can be classified into two; clean water and drinking water. Sources of water is sea water, the atmosphere, surface water, and groundwater. The problem in this research is anEffect of Usage Slow Sand Filter on Reducing Salt Levels In Well Water in Gampong Ujung Blang subdistrict Kuta Baro, Aceh Besar. The method in this study is (experimental) testing of chemicals (salinity) by means of laboratory tests, the results of research (laboratory testing) that the salt content in the raw water taken from the public wells in Gampong Ujung Blang subdistrict Kuta Baru, Aceh Besar of 1,2 mg/l and after processing by using slow sand filter treatment system of the laboratory test results show salinity content of 0.3 mg/l, so that a decrease ratesalinity by using this treatment system is 90% .

Keywords : Slow sand filter

I. INTRODUCTION

With the development of civilization as well as the increasing number of people in this World inevitably add pollutant and contamination to the water that is essentially required. Even today many companies are drilling to get the water, which can can cause decreasing of water level in areas such as Jakarta. If the drilling water tasted salty (*panyau*). Besides Jakarta, salted water can be felt by people in coastal areas or areas of the seashore. Though a few centuries ago, humans in meeting the need for clean water is easy to take on water sources that are near or around the surface at any time by using very basic equipment except in coastal area or seaside which is usually tasted salty. In urban and coastal areas wherewater supply already scarce is not possible using the simple way to get the water. Nowadays, water is polluted and it need a modern equipment and have to go through the process of processing prior to getting clean water that is free from various diseases.

The number of ways that are often carried out by the company to do water treatment such as taps that aims to generate clean water using a system of *Water TreatmentPlant* (WTP). The methods to decreasesalt level contained in water wells in the village of Ujong Blang subdistrict Kuta Baro, Aceh Besar will use slow sand filter, if these tools can be

successful in treating salted water then these tools (slow sand filter) can be used shallowwell in theseashoreareas.

The problems in this study is whether Effect of Usage Slow Sand Filter on Reducing Salinity level In Well Water in gampong Ujung Blang sub district Kuta Baro, Aceh Besar. This research will be published in national journal.

1. To determine the quality of water produced by a slow sand filter
2. To determine the process for reducing salt content by using slow sand filter
3. For determine the effectiveness of slow sand filter on the quality of water produced.

II. LITERATURE

2.1 Water

Water is a natural resource which circulate under the influence of the weather so there is something a cycle called "Cycle Hydrology" This cycle is important because it is supplied water for the land area.The water will evaporate due to the heat of the sun. This evaporation occurs in surface water, which is in the upper soil layers (transpiration, respiration). Water vapor enter the atmosphere and form the cloud and in certain weather conditions can be cooled and transformed into droplets and falls back to the earth's surface as rain. This rain water will flow directly into surface (run off). Some of them seep into the soil (percolation) and becomes groundwater both shallow and deep and some of them are absorbed by plants. Ground water will arise as surface water from the spring. Water surface together with shallow ground water will evaporate again to be a cloud. So this hydrological cycle will be repeated *(Darmono, 2001).*

The hydrological cycle is one of the natural processes to clean himself given that the air quality is quite clean. In principle, the amount of water in nature is fixed and follows a stream called "CyGaramus hydrologic or Hydrological Cycle". In the world of health, especially the health of the environment, attention to water as a factor associated with transfer or transmission of disease-causing. The water carries disease-causing form patient excrement, then up to another person's body through food and drink. Water also serves to carry the disease-carrying microbes and toxic materials it contains. Infectious diseases are usually transmitted through water are typhus, abdominal, cholera, dysenteryand others. Poisoning can also occur through the medium of water. *(Hadiharja, 1997)*

2.2 Clean Water

Clean water is the water that is used in daily basis and will be drinking water after it is cooked first. The water is safe if the water meets the requirements in terms of water supply, where the requirement in question is the requirement in terms of water quality include physical, chemical, biological and rasiologis so when consumed does not cause side effects (Permenkes No. 416 / Menkes / Per / IX / 1990). In the providing water supply there are condition that has to be met in water supply system. These requirements include such things as:

a. Qualitative Requirements
b. Quantitative Requirements
c. Continuity Requirements

a. Drinking Water

Drinking water is water whose quality meets health requirements to be drunk. Health and technical reasons underlying the determination of minimum water quality standards and the effects of each parameter if it exceeds a predetermined level. Definition of drinking water quality standards are the operational limits of the water quality criteria to include non-technical considerations e.g. socio-economic conditions, the target or the level of production quality, the level of existing health and technology available. While the water quality criteria are a scientific decision that expresses the relationship between the dose and response effect, which is expected to occur anytime and anywherefouling elements reaches or exceeds the maximum limit established, within a specified time. Thus, the water quality criteria are reference of water quality standards. Based on Permenkes No. 416 / Menkes / Per / IX / 1990, the difference between water quality and drinking water quality standards every parameter is the physical, chemical, biological, and *radiological* maximum obtained. *(Hadiharja, 1997).*

For developing countries like Indonesia to be sought ways of processing or water treatment are relatively cheap (appropriate technology), so the quality of the water consumed by people can be said to be good or to meet international standards. But there are some things that are a standard, the parameters are:

1. physical parameters
2. chemical parameters
3. biological parameters
4. Parameter radiologist *(Slamet, 1994)*

The researchparameters of drinking water quality contained in the various regulations on drinking water quality standards are specifically listed in the regulations the Minister of Health, No. 416 / Menkes / Per / IX / 1990, concerning drinking water quality standard.*(Totok 1991).*

b. Water resources

The water was polluted and this means we must maintain to drinking water that is free from disease. By way of water treatment so as to meet water quality standards. As for the sources of water include:

1. Seawater
2. Atmospheric water, meteorological water
3. Surface water
4. Groundwater

c. Nature of Water

The water in this world is obtained 3 form that is solid, liquid and gas. Which shape will be obtained depending on weather conditions in the area. The density of water also depends on the temperature and the temperature barometries pressure (P). in general, the density increases with decreasing temperature, until the maximum is reached at 4°C. When the temperature drops again, the density will drop as well. Even so the water temperature is not easily changed. It depends on the *specific heat* of water, which is a number that indicates the amount of calories required to raise the temperature of one gram of water one degree Celsius.

d. Chemical nature

Clean water has a pH = 7, and dissolved oxygen (= DO) is saturated at 9 mg / l. Water is a universal solvent, almost all kinds of substances that are soluble in water. Water is also a biological fluid that is contained within the body of all organisms. Thus the chemical species that is in the water in vast numbers. Sea water, rain water, and ground water / fresh water contains minerals. Various minerals contained in fresh water varies depending on the structure of the soil where the water was taken. For example, minerals contained in the water rather than through a chemical reaction, rather than a substance dissolved example of andesite (volcanic stone) *(Ahmad, 2004).*

e. Biological nature

Life is said to be derived from seawater. In the waters there always life, fauna and flora. This Living things are contributing to water quality. Living thing in water divided into organisms that are native and not native to that environment. Native organisms are organisms that are not pathogenic to human life. Organisms that do not natively can be derived from waste water, rain water, dust and others. Any changes in water quality will alter existing ecosystems, therefore gastrointestinal research with biological parameters usually done by identifying the species present and see if there are native and whether there are species that are not native to that environment. *(Slamet, 1994).*

f. Slow Sand Filter

Slow sand filter is a filter that uses sand bath as a filter media with a grain size is very small, but has a high quartz content. The screening process takes place by gravity, very slowly, and simultaneously on the entire surface of the media. Sand media for the first time in a tub installed filter requires initial screening operation period normally and continuously. The purpose is to finalize the initial operation of sand filter media and form a skin layer filter *(schmutsdecke),* which was to serve as a venue for the process of biochemical and biological processes. During the maturation process, the quality of the filtrate or the processed water from slow sand filter, typically do not meet the requirements of drinking water.

III. RESEARCH METHODS

3.1. Place and time

This research was conducted in the laboratory of the EngineeringFaculty, Abulyatama University March 1st, 2016 until March 30th, 2016.

3.2 Types of Research

This research is the use of the kinds of experiments and laboratory tests that measured his assessment of water quality produced by these tools (slow sand filter).

3.3 Equipment and Materials

In this study used a screening tool made from fiber drum by using the following media;

1. Small gravel 1 M^3
2. Sugar palm fiber 0.5 M^3
3. charcoal 1 M^3
4. Sugar palm fiber 0.5 M^3
5. fine sand 1 M^3

The functions of each medium is:

1. The sand acts as a filter of sludge precipitated and other chemicals
2. gravel serves as mud resistor
3. sugar palm fiber serves as mud resistor
5. Coconut shell Charcoal serves as odors remover

3.4 Methods

Prepare perforateddrum by a height of 10 cm, mounted the faucet to drum hole so it's ready to use. Wash the sand, fibers and gravel to clean up, sand, fibers, and pebbles colorless. After all the ingredients are arranged properly, do the trial process, by flowing raw water tasted salty (brackish), which had been taken from the raw water source, and then input the raw water into the water reservoir of raw, then open the tap water until it flows well,the raw water is filtered by using gravity. The results of the treated water can be seen when we open the tap water processed.

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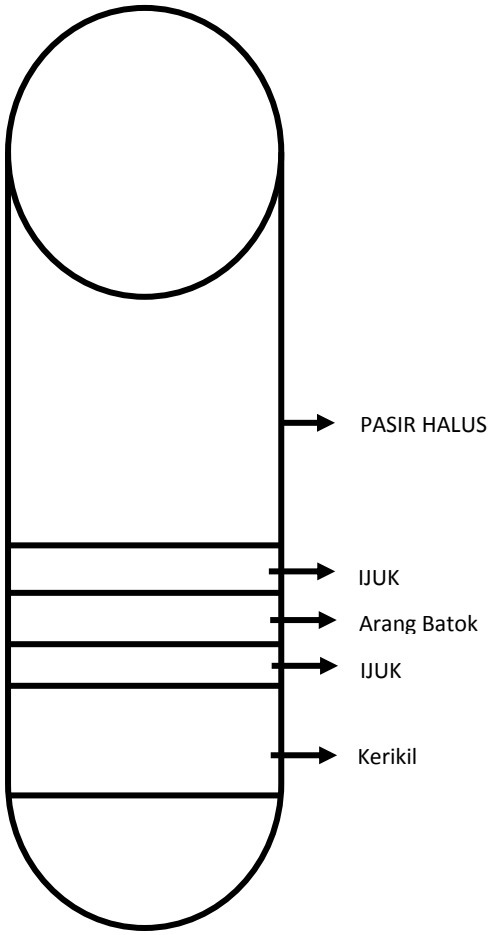


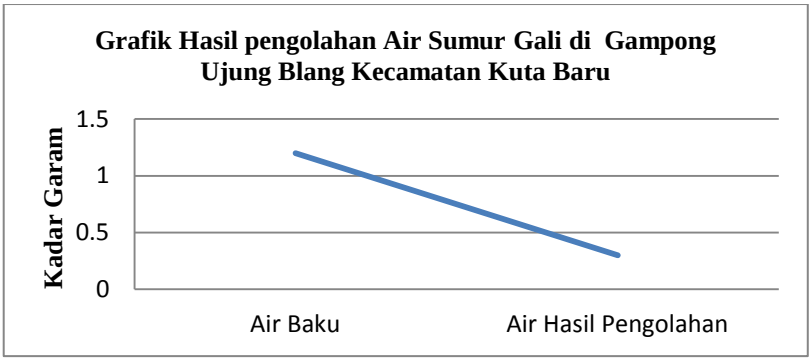
Diagram Alir Saringan Pasir Lambat

IV. DISCUSSION

In this study, a sample of raw water taken from wells dug in the Village community Ujung Blang sub-district, Kuta Baru Aceh Besar district, where the sample of 200 liters of water. The samples were taken by using a bucket and the condition is quite sterile. The sample is put into a slow sand filter treatment facility by means of gravity. The processing is done after all the media is cleaned. From the results of laboratory tests are known that salt levels in the raw water taken from wells in Gampong Ujung Blang subdistricts Kuta Baro of Aceh Besardistrict, as shown in the following table:

Tabel 1. Results of Dug Well Water treatment in the Village district of Kuta Baru Ujung Blang, Aceh Besar District

No.	sample type	Parameter	Unit	Method	Quality standards	result
1	Raw water	Salinity	% 0	Elektrometri	-	1.2
2	Water Treatment Results	Salinity	% 0	Elektrometri	-	0.3



Judging from the graph and the table above that the studies using slow sand filter lowering the levels of salt in wells in the Village Ujung Blang, subdistrict Kuta Baru Aceh Besar district.The decreasing levels of salt in the raw water, down to 90%.

V. CLOSING

5.1 Conclusion

This simple tool to reduce salt levels can produce clear water. Because of the salted water suspension (brackish water) has a fairly large particles compared to the density of the components of the water purification so that the dirt left in it. The most interesting aspect of the slow sand filter system is a simple operation, easy and inexpensive. If the construction of the filter is designed in accordance with the planning criteria, then these tools can produce good results and cheap. From the processing of raw water using slow sand filter enough in reducing salt levels in wells in Gampong Ujung Blang sub-districtKuta Baru, Aceh Besar district, the decline is very effective at 90% (0.2 mg / l) of the total content of salts contained in water raw (1.2 mg / l).

5.2 Suggestions

1. We recommend that you use the wash tank should be made separately so that we do not recycle process again.
2. Size of sand particles should be finer or filter has a smaller size (micron). For porous sand has a size of 5-30 microns.
3. If the water treatment using slow sand filter on a large scale should use pump toward processing tank

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