

CONVENTIONAL WELL INFLUENCE TOWARD THE ENVIRONMENT (STUDY CASE: WONOCOLO, EAST JAVA)

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ABSTRACT

Wonocolo has many conventional well. A conventional well, also known as a traditional well is a well that produces oil or gas from a conventional formation. Conventional formations are variable in age and other aspect. The aim of our research is to know the conventional well influence toward the environment, that abiotic, biotic and culture (social, culture, politic).

Method of our research is literature study, field observation and in-depth interview. Literature study is look for information and data from the supporting books and papers. Field observations is direct research operations on research location with the data collection form of photographs. In-depth Interview is interview to the community around the conventional well environment.

The result of abiotic environment in the research area is having dry clay soil, and warm air. The water condition is good better than in unconventional well because the river around the research area is not too wide. Biotic environment in research area is mostly *Tectonagrandis L*, adapting the soil condition. However, social side of environment is the community will not permit if the conventional well is managed by BUMN or government, because the community is worrying if they get the negative impact to environment.

Keyword: Wonocolo, conventional well, environment

INTRODUCTION

Wonocolo is located Bojonegoro Regency, East Java. Crude Oil Exploration in Wonocolo's Conventional Well has been there since Belanda Colony. At that time, crude oil exploitation is done by Belanda's Oil Company. However, the exploitation is done by the community around the location after Indonesia freedom. They exploited crude oil from Subsurface using simple equipments, e.g. a drill which is pricked off to the subsurface and then it is pulled using diesel equipment. The crude oil is transported to vessels before it is sold to Pertamina (<http://tribratanewsbojonegoro.com>, 2016).

Since Wednesday (April 27th), the conventional well region in Wonocolo is became Oil and gas Tourism object officially by The Regent of Bojonegoro, Suyoto. Wonocolo has old conventional well. There are 7 wells with average production 30 drums/day or 6000 liters/day.

Exploration in a simple way causes lots of crude oil which is spilled around conventional wells. Based on previous elaboration, it is important to do research on the effects of traditional exploration in Wonocolo. Does the spilled oil affect the biotic and abiotic environment in exploration area? Do the

conventional wells affect the social and cultural environment of communities in the exploration area?

Literature Review

Based on the law Number 23 in 1997 about Environmental Management, the definition of environment is the unity of spaces with all things, power, situation, and living creatures, including humans and their behaviors affects the continuity of our life, human welfare and other living creatures. This research is related to the environment.

Environment consists of 3 components: abiotic, biotic, and cultural environment. Abiotic environment consists of the elements of water, air, soil, rocks, energy and material contained therein. Biotic environment consists of the animal and plant elements. Cultural environment consists of the elements of social systems, economic, cultural, and welfare (Tandjung and Gunawan, 2006).

Traditional exploration is committed by the Communities of Wonocolo, Kedewan District, Bojonegoro Regency which cannot separate from exploration history in Cepu Block, since the Dutch era. Dutch Colonial Government did traditional oil exploration in Wonocolo by utilizing local communities; from generation to generation of local communities did traditional oil exploration business. After it is left by Netherlands since moved to Kawengan, the wells in Wonocolo is explored by communities until now (Naumi and Trilaksana, 2015).

Siddiqoh (2015) and Yudhanto (2013) investigated Wonocolo village's conditions related to the conflict there.

Methods

The method used in this research is the study literature, direct observation in the field and in-depth interview directly to the study site. Researchers conducted in-depth interviews to related people at the location of the study such as village officials, communities of Wonocolo, miners and others. Direct observations in the field observe the environmental conditions of abiotic, biotic and social culture.

Equipments used in this research are pen, paper, camera, laptop and mobile phone.

RESULTS AND DISCUSSION

Literature results

Tuesday, June 7th, 2016. Source: Journal of Jelajah Sumur Tua, 2006, Book "Energi Antar Nusa". Here, it is written that conventional wells are managed by the communities, the government has been gave permit for conventional wells exploration in Wonocolo area, especially in Cepu Block. Communities' response of licensing is pretty good because it will recruit a lot of manpower from the village. In this source, communities hope greatly to the establishment of KUD to manage conventional exploration in the conventional wells area. Conventional wells have been opened as a tourism object of traditional oil. sainsjournal-fst11 on December 04th, 2011 in PENCEMARAN LINGKUNGAN ([http://sainsjournal-fst11.web.unair.ac.id/artikel_detail-38716-PENCEMARAN%20LINGKUNGAN-Pencemaran%20minyak%20bumi%20\(crude%20oil\).html](http://sainsjournal-fst11.web.unair.ac.id/artikel_detail-38716-PENCEMARAN%20LINGKUNGAN-Pencemaran%20minyak%20bumi%20(crude%20oil).html))

Contamination of petroleum (crude oil) can occur in the air, soil and water. Oil pollution on land regarded as contaminants that can reduce the productivity of the land. Anxiety that this contamination will be a problem in the future is a very reasonable thing considering the shape, character and the number is larger and constantly increasing. Contaminant in the soil is a chemical that can be caused by human activity. Contaminants can go into the ground intentionally and unintentionally. Deliberate such as pesticide applications, petroleum drilling activities in both modern and traditional, as well as examples of inadvertence, like oil spills due to accidents, leaks, etc. Soil contaminants also called as hazardous waste or contaminants (pollutants) of land, consisting of assorted chemicals including:

1. Solution containing chlorine, such as triklorotilena (TCE) and tetracloroetilena (PCE).
2. Explosives, such as 2,4,6-trinitrotoluene (TNT)
3. Metals, such as chromium and lead.
4. Radionukleida, such as plutonium.
5. Pesticides, such as atrazine, benlat and mathion.
6. BTEX (benzene, toluene, ethyl benzene, xylema).
7. PAH (polycyclic aromatic hydrocarbons), such as creosote.
8. PCB (polychlorinated biphenyl), such as aroclor mixture.

Hazardous waste is waste that has the properties as follows: corrosive, flammable, reactive, toxic "leachate", and easily transmitted (hospital waste). Waste or oil spilled becomes the pollution problem because this waste is classified into hazardous and toxic waste. Globally, needs fulfillment demands humans to do developments in the implementation of operations require the need of energy as a driving force. Development indirectly requires the use of natural resources such as petroleum.

Until now, oil is a source of fuel that has not been replaced by other materials. If it is not used wisely by considering the environmental conditions so it cannot be denied will cause environmental problems (pollution). Pollution will lead to imbalances and if it happens constantly can endanger the life of humans, plants and animals in this nature. Certainly, in the petroleum exploration process will be the generated wastes. Petroleum mud waste is a product that cannot be avoided by any oil exploration companies and it is causing pollution to the environment (Sumastri, 2005). Since, petroleum waste mud has a hydrocarbon component or total petroleum hydrocarbons (TPH) are an organic compound consisting of hydrogen and carbon, for example benzene, toluene, ethyl-benzene and xylema isomers.

Total Petroleum Hydrocarbon (TPH) is a measurement of pollutant concentrations of petroleum hydrocarbons in soil as well as the entire oil hydrocarbons contaminants in a soil sample that is often expressed in units of mg hydrocarbon / kg soil (Nugroho, 2006). Petroleum mud is including hazardous and toxic wastes (B3), when referring to the Regulation no. 85 of 1999 on the B3 waste. The regulation stated that each producer that generate B3 waste is only allowed to keep the waste at the latest 90 days before it is processed and need processing well so it does not pollute the surrounding environment. According to Law No. 23 of 2009 on the management of B3 waste is to do with the reduction, collection, storage, transportation, usage, processing, and /or landfill. Petroleum contamination in soil is a serious threat to human health. Petroleum pollutes the soil and it can reach the location of

groundwater, lakes or springs that provide water for domestic and industrial needs so that it becomes a serious problem for areas that rely on groundwater as their main source of clean water needs or drinking water. Petroleum pollution, although with very low concentrations of hydrocarbons greatly affect the odor and taste of ground water (Atalas and Bartha 1997 in Nugroho, 2006). Waste must be treated before being discharged if they contain contaminants that cause the environment damage, or at least have the potential to create pollution. In a process of waste treatment, it must be made an estimation first by identifying the source of contamination, function and type of material, quality and type of effluent treatment system and the function of B3. Based on the estimation, then it is created the pollution control and prevention programs considering waste, either in bulk or small, short or long term will result in a change to the environment (Kris, 2002). Petroleum and Natural Gas exploration traditionally managed / communities' exploration in Bojonegoro which are in the districts of Kadewan, there are 74 units of wells which includes 44 wells in the village of Wonocolo with a production capacity of 25.771 liters / day, 18 wells in the village of Hargomulyo with a production capacity of 12.771 liters / day and 12 wells in Beji village with a production capacity of 8249 liters / day. At any exploration activities in the wellbore (cutting), there is the spillage of oil around the land due process of transporting the oil, either through the pipeline, transportation, as well as scattered as a result of the removal process (Nugroho, 2006). When petroleum contaminated soils, examples in the exploration area in Bojonegoro if it is analyzed, nutrient contains macro elements for carbon (C) 8.53% (medium), nitrogen (N) 0.20% (low), Phosphorus (P) 0.01% (very low), Potassium (K) 0.22% (medium) and the levels of TPH is 41,200 mg / kg. From the results of this analysis, the soil is not good for plant growth and agriculture because N is low and relatively high hydrocarbon compounds. Based on biological basis, one effort to overcome the hydrocarbon contaminated soil is to do bioremediation. Bioremediation is an alternative that is conducted where the contaminated soil is cleaned by utilizing the ability of microorganisms to degrade the contaminants that are friendly to the environment because the land was polluted generally cannot be planted (Nugroho, 2006).

Observation result

(abiotic, biotic, culture condition)

Research environment is shown in Figure 1 and Figure 2. Figure 1 and Figure 2 shows the location of the conventional wells that are very close to each other. According to the information, conventional wells are adjacent each other because the owner of the well is family.

Figure 3 shows the existing conventional wells at the research sites. The conventional wells are still using tools that are very traditional. The simple tools are extremely endanger to the miners because the security tool is very minimal. Communities are stringing the drilling tool by themselves. Although there are who have been already using iron, but they still use their traditional drilling tools.



Figure 1. Research Location Environment



Figure 2. Research



Figure 3. Conventional Well



Figure 4. Oil Storage

Oil storage (Figure 4) is just like the usual pools. Even though, the pools are used as the storage of petroleum from the drilled wells with high temperatures. The miner communities seemed to be very familiar with the oil storage. But then, the oil storages are not very secure. The result of oil which is already collected then separated from mud, water, as well as crude oil manually (traditional) in the shelter. Water will flow into a smaller shelter, mud and crude oil in the big crude shelters. Then, the separated crude oil is taken and put into *drijen* which can be seen in Figure 4. Oil movement which is still mixed with mud to *drijen* uses traditional tools such as bailer and *torong*. Soil around the pools of crude oil storage looks black. During the rainy season, the crude oil will pollute the surrounding environment.

Road access to the exploration site is very bad (Figure 5). The road to the exploration site has not been in the asphalt ground. The road is poor during the rainy season. Yet, when it does not rain, the soil in that place is very dry (Figure 6).



Figure 5. Road Access to Research Location
Research Location



Figure 6. Soil Condition in

Most of the plants around the exploration site is teak / *Tectonagrandis L* (Figure 5). Water conditions are very poor in our research location (Figure 7). The water around the site is mixed with the waste water from the exploration, so that the water is polluted. Sanitation at the conventional wells site is so bad.



Figure 7. Water Condition in Research Location

In-Depth Interview Results

Sunday, June 5th, 2016

Source: Mr. Edo as the Warehouse Supervisory PT. Pertamina Asset 4 Cepu.

Interview result:

In Cepu Block and surrounding areas including the village of Wonocolo, there are still many old wells. The communities own who manage the conventional wells. The method of oil exploration according to source, it is done by inserting a long metal rod to take the fluid , then drawn up using a rope that is rolled and stretched using a machine that has been modified.

The obtained fluid results are then collected in the collectors. From the fluid collector is then processed in the oil processing factory traditionally. The oil that has been processed is used as fuel for public transportation, trucks and other large vehicles. Licensing for conventional wells itself is still illegal. Their sales are still not receiving permission from the government, yet.

Thursday, June 9, 2016

Sources: Community around Research Site

Source informed that exploration in Wonocolo village is still traditional. The fluid can be collected at KUD, from KUD then sent to Pertamina. However, nowadays the resulting oil is less than the mud. Therefore, Pertamina feel aggrieved. In conducting the exploration of oil over there is less attention to safety, while the distance among one well to the other wells are very close.

Sunday, June 26th, 2016

Source: Government (Tutuk Kusdwati)

Basically, the Wonocolo village is an oil producer. Oil wells there are managed by the heredity to posterity. The location of Wonocolo village is including Bojonegoro district. One village does oil exploration traditionally. From the government had sent people to investigate about Amdal there. According Mrs. Tutuk, the location there is not very environmentally friendly; water is polluted, while communities remain mined oil when the environment has been polluted. In terms of environmental health is lacking, in terms of cleanliness, too. The government has tried to build a clinic. The government came there directly but it was rejected by the communities. For the construction of KUD there, the government was working hard to develop and looking for approval from communities there. Not only KUD, the government has tried to build healthcare infrastructure, etc. It all had been rejected by the people in Wonocolo village.

For terms of education is very sad, the children graduate from elementary school and stop school to continue his father's work, namely mine oil. There, the vocational graduates have been very grateful. Not the education that they seek but a son to continue the work of his father and it has happened until now. Parents do not send their children to school, because they are concerned about the oil well that they no longer managed.

For the construction of health centers, they refuse because if there are no health center, they think locations in Wonocolo is already heavily polluted. If there are clinics or health centers will improve people's health and the cause of the pain will be investigated and consequently leads to the environment. As a result of the oil exploration could be closed. So, there is no clinic in Wonocolo village. There was doctor came to one of citizen's house only once a week.

Communities there are tight-lipped when they are asked about the environmental, social and political. If there are people of government come, people will avoid. Pertamina was not willing to buy crude oil from Wonocolo, because crude oil contents contain most mud than oil. Like they could take 10 liters, after oil was processed, the result was less than 2 liters, and the remaining content is water and mud. Other causes, because there was a conflict between Wonocolo and Pertamina, Wonocolo's villagers protest against Pertamina.

Not long ago happened fire and the victims were two mans and 1 child. 2 wells were fired, while firefighters would extinguish the fire but they could not get in because the location there filled by exploration wells. Distance among wells from 50 m. So, the fired well on eventually take its victims again.

CONCLUSION

Based on the literature results, field research directly and in-depth interview, it can be concluded:

1. Abiotic environment in the research area is having clay soil dry, and warm water.
2. The water condition is good better than well in unconventional Because the river around the research area is not too wide.
3. Biotic research environment in the area is mostly *Tectonagrandis* L, adapting the soil condition.
4. However, the social side of the environment is the community will not permit if the conventional well is managed by state-owned enterprises or government because The community is worrying if they get the negative impact to the environment.

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