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Using the water separated from water and oil basins for green space irrigation

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Key words: Asmari, basin, green spaces irrigation, separated water.

Abstract

This research was conducted in Gas Compressor Station in Ahvaz region-2 (Asmari) Karoon Company, and oil, water and soil basins were sampled and samples were transferred to the laboratory to analyze soil and water quality parameters. Mixing basins were analyzed in terms of EC, TDS, TSS, and pH and then were assessed in several different level and dilution based on the level of water quality. Analysis performed on basin water included measuring total suspended solid salts, total soluble salts, electrical conductivity and soil reaction. The results showed that, among mixing samples, the one tested by treatment of 75% irrigation water and 25% separated water was more appropriate for irrigating green space than the other samples. In this treatment, Asmari Gas Compressor Station sample had EC=3320 µS/cm, TSS=0. mg/lit and TDS= 994 mg/lit, the results showed that the use of unconventional water for environmental purposes required specific management, which in addition to desirable utilization did not have environmental and health hazards for the soil, plant, and surface and underground water resources.

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Introduction

In many parts of the world, water is used for various purposes. One of the main points in using wastewater in green space and agriculture is considering wastewater quality used and standards established in this regard, and can be said that the utilization of wastewater may have detrimental effects on human health, soil quality, health and environment. In the Mediterranean, the treated wastewater is considered as an important source of irrigation in agriculture (Jafari, 2002).Wastewater which was considered as a source of contamination at a time now is considered as a new source of water supply in the world. Water managers and planners were led to seek the use of non-conventional water resources to achieve sustainable development due to limited water resources, climate fluctuations, and uneven distribution of water in the country, increasing population, contamination of groundwater and surface water and thereby reaching to a level of water stress. Dastorani (2008) compared the use of industrial and hospital wastewater for irrigation and determined finally that hospital wastewater was more appropriate than industrial wastewater for agricultural use .Shokrolla Zade *et al.* (2009) presented the results of investigating and analyzing treated wastewater (by biological methods) of a petrochemical plant in southern Iran with the aim of reusing it for agricultural irrigation purposes and green space. Reusing wastewater for irrigation uses were proposed due to the dryness southern regions of the country, the expensiveness of the required industrial water supply cost, the need for water recovery, and by measuring important characteristics of wastewater. The present study was conducted to achieve the mentioned goals and use separated water from oil and water basins of GAS Compressor Station, as an alternative water source, for irrigating green space .The main objective of this project was investigating the suitability of separated water for green space around the processing facility and presenting appropriate solutions to improve quality up to the standard level.

Materials and method

Study area

This section included 5 gas compressor stations which received associated gas from the second, third and fourth stages of adjacent operation unit and separated gas and water liquids in a three phases gas separator after pressure compression and integration. Gas and liquid gas were separately sent to No. 700 and 800 gas and liquid petroleum gas factories through pipelines and the generated water was conducted to the adjacent operation unit.

Sampling

After studying the status of oil and water basins at gas compressor stations, water sampling was performed and the samples were transferred to the laboratory for water quality parameters analysis. Separated basins were completely analyzed.

Treatments

The water should be analyzed at four different levels due to the basins water quality: a mixture of 25 % basin water and 75 % well water (drinking water), a mixture of 50 % basin water and 50 % well water, a mixture of 75 % basin water and 25 % well water, 100 % use of the basin water, control: 100% use of well water.

Analysis

The analysis included TSS, TDS, EC, and pH. Basin dimensions were approximately five to ten meters with the depth of about six meters in five Asmari Gas Compressors Stations of Karoon Company. The fluid was drinking water in five basins used for washing the station and machinery that was contaminated with oil. The main contamination of water was related to the oil on the water, and the salinity was too low because the water was supplied from Karoon River and had no relation with the zone.

Results and discussion

Figure 1 showed that pH levels were greater than 7 in all samples and the sample with 25% basin water and 75% irrigation water had the lowest pH than the other

samples regarding (75 % -25 %, 50 % -50 %, 25 % -75 %) separated samples. But in general, all samples were accepted for irrigation in terms of water pH level.As it was observed in figure 2, all samples EC was more than 3000 µmhos/cm and the samples with 75% irrigation water and 25% basin water had lower EC than other separated samples regarding separated samples (75 % -25 %, 50 % -50 %, 25 % -75 %). But generally, all samples had limitations for irrigation and located on C4 Class based on Wilcox Table and had difficulties in terms of irrigation.As it was observed in figure 3, all samples TDS was more than 800 mg/l and the samples with 75% irrigation water and 25% basin water had lower TDS than other separated samples regarding separated samples (75 % -25 %, 50 % -50 %, 25 % -75 %). But generally, all samples had limitations for irrigation and located on C4 Class and had difficulties in terms of irrigation.

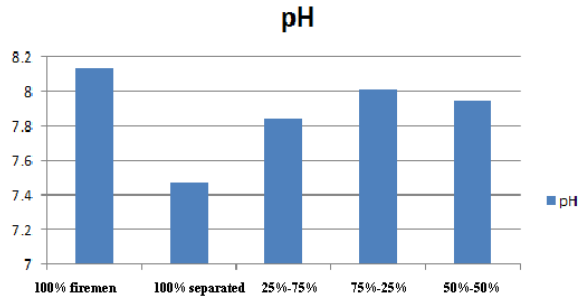

Fig. 1. Comparison chart of soil reaction rate of separated water different ratio in Asmari.

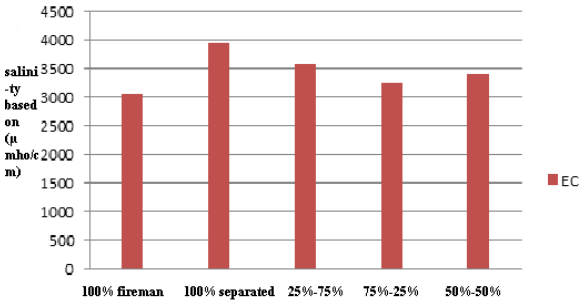

Fig. 2. Diagram of EC amount different ratios of water separated in Asmari area.

As it was observed in figure 4, all samples TSS was more than 0.0055 and the sample with 75% irrigation water and 25% basin water had lower TSS than other separated samples regarding separated samples (75 % -25 %, 50 % -50 %, 25 % -75 %). But generally, all samples did not have limitations for irrigation due to having TSS less than 40mg.l.There was a considerable possibility of adverse health and environmental effects. In general, in a comprehensive and engineering design, reuse of wastewater considering wastewater treatment to the extent to achieve quality criteria recommended by monitoring operations program, is mostly focused on treatment stages; however, ongoing evaluating and monitoring treatment stages and design components including soil, crops, groundwater and surface water resources workers health are essential due to probable problems in the treatment stages or potential deficiencies in the management.

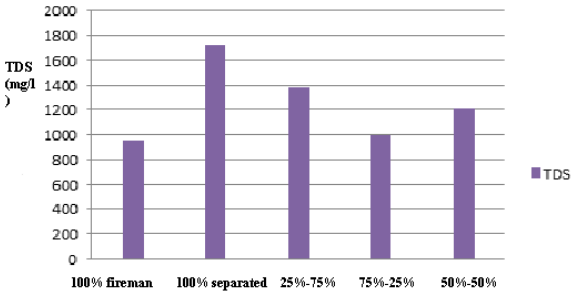

Fig. 3. Diagram of EC amount different ratios of water separated in Asmari area.

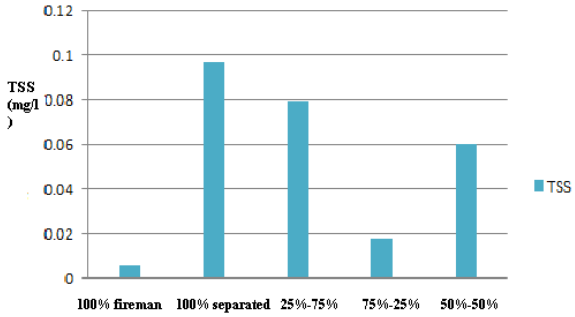

Fig. 4. Diagram of different ratios TSS of separated water in Asmari area.

Conclusion

Environmental monitoring program included evaluating efficiency of wastewater treatment plants to improve the quality, quantity of wastewater generated, evaluating the quality of wastewater, returned consumed water, and adjusting it with the considered standard, water supply line to the place of consumption, quality and quantity of products, and

other activities in design to achieve the objectives of the project. In general, objectives of the monitoring plan are as follows:

-Evaluating project components to achieve optimum yield

-Amending various sections and components of the system to reduce the potential health and environmental effects

-Controlling the effectiveness of programs and proposed actions to eliminate or minimize health and environmental effects and consequences

-Changing system components to increase the efficiency and yield of the system components and sustainable use of these resources.

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