

Evaluation of Petroleum Hydrocarbons in Groundwater Plains City of Bandar Abbas

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ABSTRACT

The issue of contamination of underground waters by chemicals such as oil hydrocarbons which is originated from contaminating sources and origins is inevitable. From among oil contaminants can one refer to oil wells, underground and ground reservoirs of oil products and or oil transfer pipes. Although leakage rarely happens in the reservoirs, this can have a great impact on the quality of the underground water. In this research carried out from March to October 2007, sampling operations were randomly done on 31 water wells of the villages on the plain of Bandar Abbas (Sarkhoon, Shamil Ghaleh Quazi, Isin, Kahoorestan, Rezvan, Sarzeh, Fin and Gohreh). To measure TPH sampling from agricultural water wells was made on the basis of ASTM D3921 by Spectrofluorophotometry. The result showed that the most amount of TPH in Gohreh plain was 0.0032 ppm and the least amount: 0.0012 ppm in Rezvan plain.

A comparison on the average results on oil substances in four political divisions (Shamil, Ghaleh Ghazi, Central, Fin) showed that the most amount of TPH exist in Fin for 0.0020 ppm and the least amount belongs to central division for 0.0013 ppm. The map 1/1000000 of the city of Bandar Abbas was divided into 4 regions: region 2 with the most amount of TPH for 0.0020ppm and region 4 with the least amount for 0.0014ppm. The main cause of TPH density in Gohreh plain which is situated at Fin division and region 2 can be the vicinity of the static level of underground waters to the ground level and the vicinity of sampling area to the pumping station of oil substances in Ghotb Abad area. According to the research it became obvious that amount of oil substances in the under ground waters of the city of Bandar Abbas stands lower than standard level but due to the population growth and the increase in contaminating origins the issue of the underground contamination due to oil products is of highly concern and significant so this requires the concerned organizations and companies to do constant measurement in this regard.

KEYWORDS: TPH, contaminating sources and origins, plain, underground water, the city of Bandar Abbas.

1. INTRODUCTION

Oily pollutions are a kind of chemical pollutions certainly by chemical offspring however the kind of pollution is substantial in the places by special control in this regard that our country is for by of oil owner countries and this kind of pollution because of plenty oily industries in the country has plenty out break possibility , it can be memorable like other pollutions . (Kochakzad, 1384) .

Among oily pollution sources can mention oil shafts , underground and shallow sumps of oil productions and or oily materials conduction pipes .(development and environment researches center, 1381) however down fall in sumps accomplishes in very low extent (by low daby) but this same low extent influences very much in quality of subterranean waters ,(Gilbert , 1991) .

Oil products apply hydro carbonic compounds such as banzen , toben and gezilen that this kind of materials are soluble and mobie in subterranean water .

These materials as extent as that those are toxic for animals those are pernicious for human too. (development and environment researches center , 1381) Bandar abbas county by space of 24210 square kilometers (36 percent more of province space) lies in Hormoz strait and it limits of south to Persian gulf of north to Baft and Sirjan county of east to Neiriz , Darab and Lar county and of west south to Lengeh port .(Arazm 1382) .

In this county use possibility of subterranean waters is through fountains , aqueducts and shafts and use of these waters is possible and thinkable in plains totally .

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Purpose: In this research be appointed the quality of subterranean water of Bandar abbas county by emphasis on present plain and by emphasis on sumps place of oil productions keeping in respect of pollution to oily hydrocarbons.

There is possibility that sumps and oily productions stores and or gas stations and use enters of this productions have been leakage and see page of oily materials to under ground and in result it should be recognized subterranean water mines , be specified their quantity and quality and be appointed pollutant mines too .

It's certain by applying quantity and quality operation management, mean time the best use of subterranean water mines can be used qualitative and pollution criterions according to accepted standards

Materials and methods : Recognition of gas stations and sumps pitch place dependent to oil productions that it consisted location of major consumers , for by consumers , gas station , oil productions salesman ships and survey of scale and kind of oil productions of these consumers that they have subterranean and upterranean sumps for store of oily materials , for this purpose all lists of oily productions scantiny subscribers received of oil productions distribution national company of Hormozgan zone and it estimated geographical position of main consumers of over of 1,000,000 people map of Bandar abbas county and specified over the map by use of Arc Gis 902 soft ware .

I sin plain in extent of 230 square kilometers has lied in 20 kilometers of Bandar abbas north .

I sin plain latrine zone lies in geographical coordinates confine by 27°14' until 27°26' of north width and 56°21' of east length . (studies assistance of water mines base , 1383) Sarkhon plain in approximate extent of 95/7 square kilometers has lied in 40 kilometres of Bandar abbas north consists of two subzone north Sarkhon and south Sarkhon and in order they have 2200 meters height of sea surface .(studies assistance of water mines base , 1383)latrine zone of Takht plain and GHaleh ghazi of SHamil between lengths of 56 1' and 56 3' and widths of 27 15' and 2815' lies in 40 kilometres of Bandarabbas east north .

All extent of latrine zone is 3671 square kilometers . (studies assistance of water mines base , 1380) Kahorestan plain has limited in space of a bout one hundred kilometers of Bandar abbas west north and in the path of Bandar abbas Bandar lengeh and Lar between geographical lenth of 25-55 until east 45 and 55 and widths of 05-27 until north situated and of north to Moro mountain , of south to Darhamesh mountain , of east to kal river and of west to SHO mountain . (studies assistance of water mines base , 1383) Sarzeh plain Rezvan has lied in 52 kilomtres space of Bandar abbas west north .

The extent of this plain is equal by 76 square kilometers and the extent of plain latrin zone is equivalent by 320 square kilometers (studies assistance of water mines base , 1384) .

Studies confine of Fin and Marm by space of 1746 square kilometers have lied between geographical widths of 28 and 2735' .(studies assistance of water mines base , 1384) .

Geographical place of distinct plains specified by use of Arc Gis 902 over map .

Sampling operations implemented accidentally of 31 water shafts in 18 villages and 2 existent water shafts in distribution national company of oily productions that implemented sampling of villages agronomy water shafts and in any village selected two shafts in the form of random, one selected first of village and other selected end of village and in near to each other village selected one shaft in any village In this process sampling operations were in this form that of any water shaft picked up water 1.5 liters .

Sampling waters of shafts be experimented in laboratories .

Sampling implemented for TPHmeasurement , salinity , electrical conduction , hardship , TDS , PH , alkalinize and darkness.

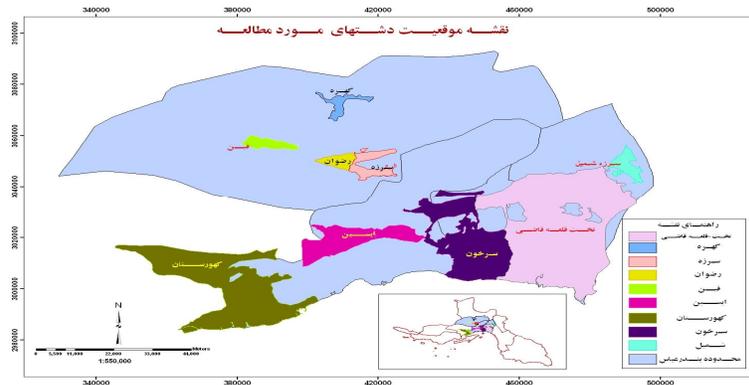


Figure1. Map location plains



Figure2. Map of sampling stations in the plains

Comparison of the plain facts: After sampling a few of the variables used in this study include pH-total dissolved solids - Alkalinity - salt - hard - Electrical Conductivity - Turbidity - TPH, statistical analysis software to SPSS12 Ttest independent methods and were Excel.

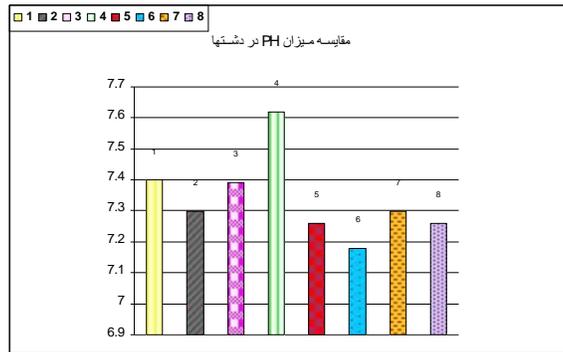


Figure3. TPH compare the Plains

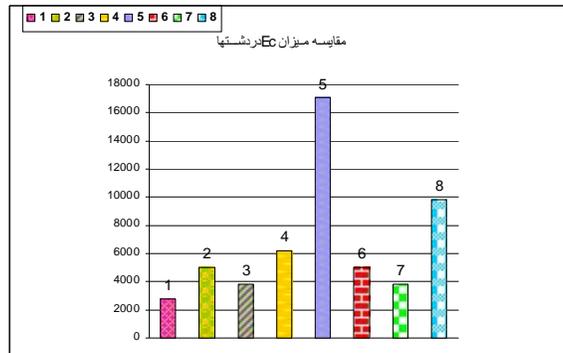


Figure4. EC compare the Plains

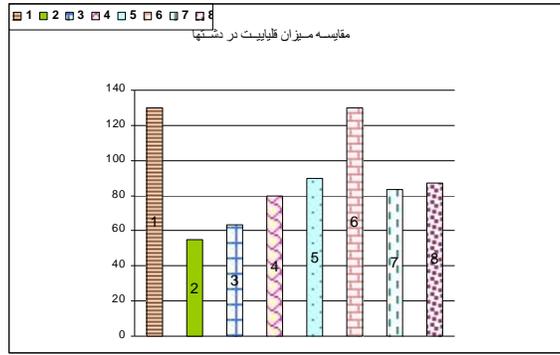


Figure5. Alcalyne compare the Plains

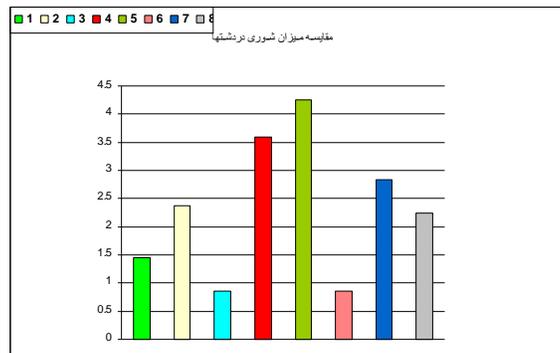


Figure6. Salinity compare the Plains

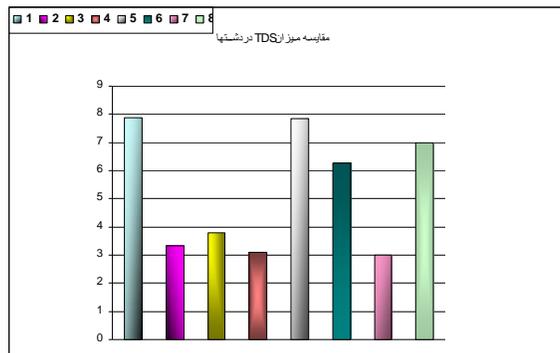


Figure7. TDS compare the Plains

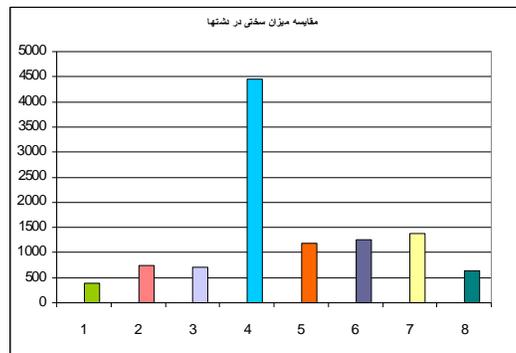


Figure8. hardness Compare the Plains

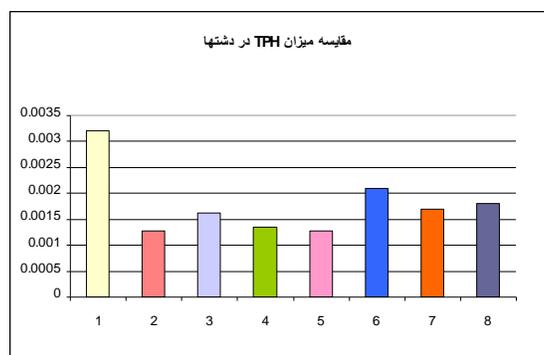


Figure9. TPH Compare the Plains

Table1. Average depth of wells

Average depth of wells	Place of sampling	plain	Row
8	Gohreh	Gohreh	1
	Ghotbabad		
53	Issin1	Issin	2
	Issin2		
	Tazian1		
	Tazian2		
	Shahro1		
	Shahro2		
	Kalat1		
	Kalat2		
45	Sarkhon1	Sarkhon	3
	Sarkhon2		
	Abshorak		
38	Sarzeh	Sarzeh	4
43	Rezvan1	Rezvan	5
	Rezvan2		
8	Fin1	Fin	6
	Fin2		
34	Kahorestan1	Kahorestan	7
	Khorestan2		
	Kalmatali		
27	Ghaleghazi 1	Shamil-ghaleghazi	8
	Ghaleghazi2		
	Takht1		
	Takht2		
	Chahestan1		
	Chahestan2		
	Shamil		

Comparison of the plain facts: After sampling a few of the variables used in this study include pH-total dissolved solids - Alkalinity - salt - hard - Electrical Conductivity - Turbidity - TPH, statistical analysis software to SPSS12 Ttest independent methods and were Exel.

Main findings : The most scale of PH in Sarzeh plain is 7.62 and the least is Fin plain by 7.18 .
 The most electrical conduction in Rezvan plain is 170 80 M/cm and least in Gohreh plain is 2788M/cm .
 The most alkalinize scale is in Fin and Gohreh plain by 130 mg/lit and the least scale is in Isin plain by 55 mg/lit .
 The most salinity scale is in Rezvan plain by 4.25 mg/lit and the least is in Sarkhon plain by 0.86 mg/lit .
 The most scale of solution solid materials in Gohreh plain is 7.86 mg/lit and the least is in Kahorestan plain by mg/lit 3.
 The most scale of darkness is Sarkhon plain is 1.8 NTU and the least is in Sarzeh plain by 0.24 NTU .
 The most scale of hardship in Sarzeh plain is by 4460 mg/lit and the least is Gohreh plain by 390 mg/lit .
 The most scale of TPH in Gohreh plain is 0.0032 ppm and the least is Rezvan plain by 0.0032 ppm and the least is Rezvan plain by 0.0012 ppm .
 There is a negative relation between depth and electrical conduction scale .
 There is a negative relation between depth and TPH scale .

There is a negative relation between depth and electrical conduction scale .

There is a negative relation between depth and alkalinity scale .

There isn't any meaningful relation between existent samples in plain and out of plain .

Deduction : What ever we studied were demonstrator this that the most pollution scale is in Gohreh plain that it was in Fin zone and in two research zone and this is for the pump house of oily materials pump house presence that there is in this village and by handling of oily pipe lines in this pump house cause to transpire oily materials to subterranean water that certainly it has seen the scale of oily pollution that it is weaker in different villages of the extent of national and international standards .

REFERENCES

- [1] Arazm , F , 1382 , the study of Bandar abbas county industrial structure and its accordance by ecological qualification , environment expertise thesis , Bandar abbas free university , environment college .
- [2] Esmaeili Sary , H , 1381 , pollutants and hygiene and standard in environment, Tehran , Naghsh mehr.
- [3] Afyoni , M , 1381 , the pollution of environment , water , soil , air , Tehran , Arkan .
- [4] Bad luyans Ghili kandy , G , 1382, water and sewage control microbiology , Tehran , Ayish .
- [3] Titi Dezh , A , 1384 Arc Gis self teaching , Amol , north University.
- [4] Chalkesh Amiri , M , 1384 , water infiltration tenet , Tehran , Arkan.
- [5] Dabiri , M , 1382, environment pollution(water , soil,air,voice) Tehran, Etehad .
- [6] Ragerd , V , 1374 , subterranean waters recognition , Dr Hormoz Pakosh , Tehran .
- [7] Shariatpanahi, M, 1375, quality and water and sewage infiltration tenet , Tehran University [8] Mahab ghods consultant engineers company , 1384 , water and environment , research and strategic study .
- Abbas por , M , 1377. Environment engineering , Tehran , Islamic Free University , first volume .
- [9] Azimi , k , 1382, destermine a optimum method for refine of subterranean water of Shiraz refinery , the article of fourth Iran hydraulic lecture , Shiraz engineering college .
- [10] Kochakzad , M , 1384 , petroleum industry and environment , Tehran , public relations of purge national company and Iran oil products distribution .
- [11] HSE section report of Hormozgan oily materials distribution national company , 1385 , Bandar abbas
- [12] MTBE specialized technical committee , 1383 , MTBE usage attribute , Tehran , purge public relations and Iran oil productions distribution .
- [13] Central zone , 1385 , main consumers statistics , Hormozgan oil production distribution national company .
- [14] Research and development section , 85 , research and development , public relations of oil productions distribution national company .
- [15] Researches and environment development center , 1381 , the survey of subterranean water pollution of Bandar abbas refinery , research assistance Tehran University .
- [16] Standard and Iran industrial researches institution , 1365, the characteristic of drink water of exteeme lawful density for act of drinking water quality variables , Tehran .
- [17] Studies assistance of water mines base , 1380 , Bilan hydrology report of Takht plain , GHalehghazi of SHamil , ministry of power . Hormozgan zonal water company .
- [18] Studies assistance of water mines base , 1383, Bilan hydrology report of Isin plain , ministry of power , Hormozgan zonal water company.
- [19] Studies assistance of water mines base , 1383 , Bilan hydrology report of Sarkhon plain , ministry of power , Hormozgan zonal water company .
- [20] Studies assistance of water mines base , 1383 , Bilan hydrology report of Kahorestan plain , ministry of power , Hormozgan zonal water company
- [21] Studies assistance of water mines base , 1384 , Bilan hydrology report of Sarzeh plain of Rezvan , ministry of power , Hormozgan zonal water company .
- [22] Studies assistance of water mines base , 1384 , Bilan hydrology report of Fin and Marem plain , ministry of power , Hormozgan zonal water company .
- [23] Ali Hamzeh , M , 1385 , water quality standards , master of arts seminar , Bandar abbas Free University , environment management college .
- [24] Gilbert, M., Masters, 1991, Introduction to Environmental Engineering and science.
- [25] EPA-Comments on Health 7 Environmental Asseament of MTBE December 23, 1998.
- [26] Happle, m., 200, Analysis Of Dissolved Benzene Pluenees and maehyl Tertiary Butyl Ether Plumes in - Ground Water at Leaking Underground Fuel Tank Site, University of Colifprnia LosAngles.
- [27] Soild Waste Washington, Dc, 1994, Petroleum Refining Process Waste Listing Determination