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PETROLEUM AND/OR NATURAL GAS VERSUS ALTERNATE ENERGY SOURCES

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EXTENDED ABSTRACT

Petroleum is found in many places, sometimes in profusion, sometimes in dribs and drabs. It is not homogenous and in the USA is paraffin-based in the east and midwest, aromatic-napthenic along the Gulf Coast, sulfur-contaminated-napthenic in the inland southwest and asphaltic on the West Coast [1] . It is found at the surface in tar pits, beds of tar sands and asphalt lakes, and as a liquid in trapped pools underground to a depth of 4 km [2] . Shale oil is an oil-like product only after treatment of bituminous kerogen found in shale pyrolytically and natural gas is not a constituent of petroleum and is often found where crude oil is not [1] .

Early on it was found that crude oil could be thermally cracked into gasoline, kerosene, light oils and residual oils in roughly equal proportions over many samplings. Liquid fuels are useful as opposed to wood or coal, particularly in transportation. Use of petroleum-based liquid fuels increased steadily on land and at sea and made heavier-than-air flying machines possible. Use of crude oil fractions expanded enormously through two world wars and thereafter as people, industries and electrical utilities turned to oil and/or natural gas.

This intensified use of oil and gas resulted in numerous predictions of scarcity within decades. Major oil firms of the world noted that new discoveries in the Middle East could be exploited at under $2/barrel and production at home tailed off. This led to the founding of OPEC and rampant increases in the price of overseas crude, starting in 1973. Since then, new oil fields in Prudhoe Bay, the North Sea and the Yucatan Peninsula have momentarily stabilized the price of oil at $32/barrel. It is planned to export natural gas from these fields and Arabia to load centers rather than burn it.

Despite the new finds of oil, the old fields continue to deplete and it is predicted that production will level and fall off by the year 2000 A.D. so that most remaining oil will have to be devoted to transportation [3]. Projected new finds of oil are far less than known reserves. This raises questions. Oil and coal are commonly referred to as fossil fuels. What caused these fuels to be present in enormous quantities? Repeatedly in the ancient and recent past natural catastrophes have decimated the biota of the earth [4]. Vast heaps of animals, many now extinct, trees and other plant life were washed away, mixed in beds of sand and gravel and putrefied there. In other cases, vast seams of coal resulted when the biological detritus was enfolded deep in the earth and subjected to heat and pressure in the absence of gaseous oxygen.

Oil is thought to have formed either organically or inorganically. The evidence is mixed. Material of biological origin is found well mixed into petroleum deposits, especially tar pits in California. Carbon 14 tests have

indicated some oil to be less than 10,000 years old [4]. I am not aware of any Carbon 14 tests on natural gas, and assume it is many times older than oil and that it is inorganic. Natural gas is contaminated methane and hydrogen which are primordial constituents of the earth [2]. Natural gas is being off-gassed from deep within the earth and, as it rises everywhere, it encounters cooler rock that is fractured, bringing us to the subject of earthquakes.

A comprehensive theory of earthquakes has the rising pockets of methane forcing apart strata and acting like a lubricant, resulting in deep shifts or quakes with epicenters located up to hundreds of km below the surface [2]. These quakes open routes for the methane pockets to rise closer to the surface, expanding as the pressure falls. Now the methane can cause a number of phenomena associated with earthquakes, such as small uplifts of ground surface before quakes, sheets of flame rising from rifts and widespread bubbling of seawater during quakes. When the methane rises in magma as in a volcano, it is mostly burned to carbon dioxide and steam which issue into the atmosphere. In many cases, pockets of methane are trapped beneath dense surface strata to form natural gas fields or rise into petroleum deposits, thus augmenting and transforming the makeup of petroleum [2].

Earthquakes having epicenters a few km below the surface mostly occur along deformation belts of principal mountain chains. It is in such locales that crustal overturns could have quickly trapped large volumes of biological material and furnished domes where large amounts of methane can be trapped. At an average depth of 5 km, rock is cool and hard with a minimum of voids. This layer is overlain with porous rock filled with water and is impervious to rising pockets of methane unless ruptured by earthquakes [2].

During the 1970's, natural gas was officially considered "gone" and laws phasing out its use as a fuel in large boilers were passed. Reserves were estimated at 6.7 trillion steres with little potential for more [5]. In 1978, natural gas pricing was partially decontrolled and prospectors drilling deeper made strike after strike, more than doubling the known world reserves within two years. Factors inhibiting immediate conversion to a methane fuel-based economy include: (1) Oil is still available, (2) gas prices will not be completely decontrolled until 1985, (3) large users are deterred from burning gas by law, (4) officials are loath to change policy, and (5) the technology of deep drilling is new. New deep reserves of natural gas per [5] are formidable proofs of the deep-earth-gas hypothesis per [2].

The developing picture is this: (1) From 1 to 4 Km down, oil over water in fractured rock pores is found intermittently, usually along crustal deformation belts. Most of these petroleum deposits have been found and many fields are depleted although 5/8 of the oil may still be down there; (2) from 5 to 9 Km, pockets of trapped natural gas or methane plus hydrogen plus contaminants such as nitrogen, carbon dioxide, helium and hydrogen-sulfide are found in pores of fractured rock. Such pockets of primordial gasses could be almost anywhere, including underneath the Hotel Conover. (4) The ability to drill to 9 Km is confirmed in [1], but per [5] there are cases where depleted wells have been drilled deeper to reach deep pockets of gas saving up to 4 Km of drilling; and (5) as the earth continues to cool the magma zone will contract and added amounts of natural gas under tremendous pressure will fracture the

hot rock and begin to seep toward the surface. Hydrogen and carbon are two of the basic building blocks of the universe and must be present in prodigious quantities within the earth.

Resolution of the energy crisis needs an economical "sea anchor" against which other methods of producing energy can be measured while acting as a stabilizer against further deflation of the value of money. Deep-drilled natural gas could be an interim or a long-range "sea anchor" and its potential impact is as follows: (1) If the supply of gas is less than postulated in [2], [5] it still gives us time to pursue the economical alternate energy sources postulated in [6], and (2) if the gas supply is equal or greater than postulated in [2], [5] we could quickly jetison many non-profitable ideas and concentrate on fusion power since it holds out promises for man not possible by other means of power generation [6].

The new reserves of natural gas are many times greater than the dwindling reserves of crude oil [2]. This is good because gas can be used to fire all known needs of man requiring fires. This includes existing stationary or mobile equipment excepting outmoded and ultra-expensive fission reactors or the benevolent future promises of fusion power. All energy price-fixing should be terminated forthwith. We will never know what anything costs as long as there are any subsidies. If we don't know actual costs, there is no way we can decide what to do next with respect to energy. Within 10 years we have seen a swing away from natural gas since it was "gone" even though it exists in great abundance per [2], [5]. America, Canada and Mexico, blessed with such natural resources, should proceed with an organized deep-drilled-natural gas program so as to rid ourselves of the need to import OPEC crude oil. Purveyors of coal and crude oil should not fear because their products will continue to be very valuable on the world markets as feed elements for the growing petro-chemical and plastics industries which furnish products we all find useful. The above programs, if initiated, will decide in the market place which alternate energy sources have merit.

On this basis it would appear that future funds spent on fission reactor develment, OTEC, transformation of coal into liquids or gasses, power towers, beaming of photo-voltaic energy down to earth from solar collection satellites, and far-out methods of extracting hydrogen, all tend to be non-viable from the viewpoint of public financial support. However, there are a number of alternate sources which might be exploited economically, including: hydropower, methane from kelp, wind power systems, linear solar energy collection systems and wave power.

References

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