

## SCIENCE & TECHNOLOGY

### New Method of Extracting Shale Oil Reported

Occidental Petroleum, a private oil company, has developed an economical capital-intensive method for extraction of shale oil which circumvents the more costly labor-intensive procedures being developed under the auspices of the federal Energy Research and Development Administration (ERDA). The Occidental method is an in situ retort procedure, yielding kerosene crude oil from buried shale oil beds. Briefly, after drilling into the shale and removing some of it, a controlled explosion is set off to loosen the oil-containing rock and make it uniform. Pumped-in methane and air burn in the upper part of the bed, thereby lowering the viscosity of the shale oil which is then pumped out from the bottom layers. (Limiting the methane-air flow limits the fire to the methane mix, and thus prevents the shale oil from burning as well.) Although many other companies are no longer pursuing the shale oil business, some of those still in operation are planning to use this new method. Reportedly the in situ retort procedure can produce kerosene at the competitive price of \$6 per barrel, including interest and profit. Occidental Operations Director Don Bater says "We think our method is the only game in town."

### Oil Spill Hoax Exposed

In 1973, the Ocean Affairs Board of the National Academy of Sciences sponsored a workshop on inputs, fates, and effects of petroleum in the maritime environment. The workshop report makes it clear that although large oil spills are undesirable and may cause temporary, short term biological damage, there is no basis in fact to claim that they constitute or contribute to any sort of ecological disaster. Following are several quotes from one of the most comprehensive reports to the workshop, that of Clayton McAuliffe:

*"Based on observations of previous moderate to large oil spills, the quality of sea water should not be significantly affected by moderate or even large spills of crude oil or refined products. If affected, the affects are of short duration. Probably the most important effect would be the physical presence of a floating oil slick. Oil coming ashore would be aesthetically objectionable and would interfere with recreational activity ... No instances of major damages to fisheries due to crude oil have been reported."*

The report notes that in several previous oil spills, large plant and animal kills have been the direct result of the application of toxic detergents and emulsifiers by frenzied environmentalists, and not in fact due to the spilled oil.

This report, and a reading of the circumstances and press furor surrounding the statistically improbable number of recent oil spills, leads to the conclusion that the spills and resulting publicity is more political than ecological.

### Experimental Evidence To Refute Quantum Electrodynamics?

Quantum electrodynamics, the study of the particle-like properties of the electromagnetic field, has been beset with tremendous conceptual problems since its development 40 years ago. Although the approach does not make internal sense, it has provided the most accurate method of predicting features of the electromagnetic field of any theory ever devised. It has been able to predict some properties of atoms and charged particles to one part of a million!

The first serious challenge to quantum electrodynamics approach emerged from an experimental discrepancy reported this week by a research group at the University of Michigan. This group finds a difference of more than one part in a thousand between the predicted and observed value of a key quantity in quantum electrodynamics.

The building block, in a conceptual sense, of quantum electrodynamics is the fact that light, if it is of high enough energy, can convert itself into an electron and positron (an electron with positive charge). Almost all of the more complicated calculations in quantum electrodynamics are based on the calculation of the properties of the interconversion of an electron-positron pair and a pair of light rays. The most recent data in the calculation of the lifetime of the electron-positron pair (which can exist in a quasi-stable state called positronium) differs from the calculated value by about one half per cent.

If this discrepancy cannot be resolved, the foundations of quantum electrodynamics will be seriously threatened. Such a discrepancy has been expected by physicists since the 1940s.

### ERDA Announces Laser Analysis Technique

The energy Research and Development Administration announced on Dec. 16 the development of a technique which heralds a new era of analytical capabilities. Researchers at the Oak Ridge laboratories have reported that they have been able to detect a single atom of cesium in a sample of at least 10 quintillion (10 billion billion) other atoms and molecules of different kinds.

In this method, a laser beam of a frequency and intensity unique for the atom to be detected is pulsed into a chamber containing the sample. The particular atom is energized and thereby ionized by the beam, while the other atoms are unaffected. The detection and counting is actually done on the single electrons which the ionization of the atom in question has yielded. Although ERDA has so far indicated applications to compositional analysis only, the method should provide information and insights concerning chemical reactions, and field-matter relationships within atoms. Over the longer range, there is also the possibility of using the laser technique to trace impurities in gases by collecting the ionized atoms on properly charged surfaces.