# Nuclear fusion*

The question might arise, If the energy potential of breeders is so good, why bother with trying to achieve controlled thermonuclear fusion? There are several answers to this question. The first that comes to mind has to do with the amount of energy resources controlled fusion would make available to man. Fission through breeders will supply us with energy for centuries or perhaps thousands of years. But, with the successful use of controlled fusion, man will have a virtually unlimited energy resource at hand. Even at a power consumption rate many times that of today, he will have an energy reserve that will last for millions of years. Furthermore, he will be able to use this energy with a minimum of manageable radioactive wastes and, as I will point out in a moment, to use it in many remarkable new ways.

The fusion processes employ deuterium as their fuel. Deuterium is a stable heavy isotope of hydrogen present in all water in low concentration. In many of my talks to general audiences, I have tried to point out the abundance of this energy source in nature by saying that controlled fusion would give us an energy equivalent of 500 Pacific Oceans filled with high-grade fuel oil. But in every audience there is someone who seems to misinterpret this. As a result I have heard it said that the Chairman of the AEC plans, through some atomic magic, to make 500 Pacific Oceans full of oil. In view of the incident off the coast of Santa Barbara this year, that creates a rather frightening image to many people. Therefore, I may not use that particular energy analogy again.

In all seriousness though, the potential of controlled fusion is so impressive that the attainment of a power system based on fusion reactors must be one of our long-term energy goals. I stress "long-term" here. If we call to mind that the first practical demonstration of a sustained fission reaction occurred on Dec. 2, 1942, and that over 25 years then passed before an economically competitive nuclear

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