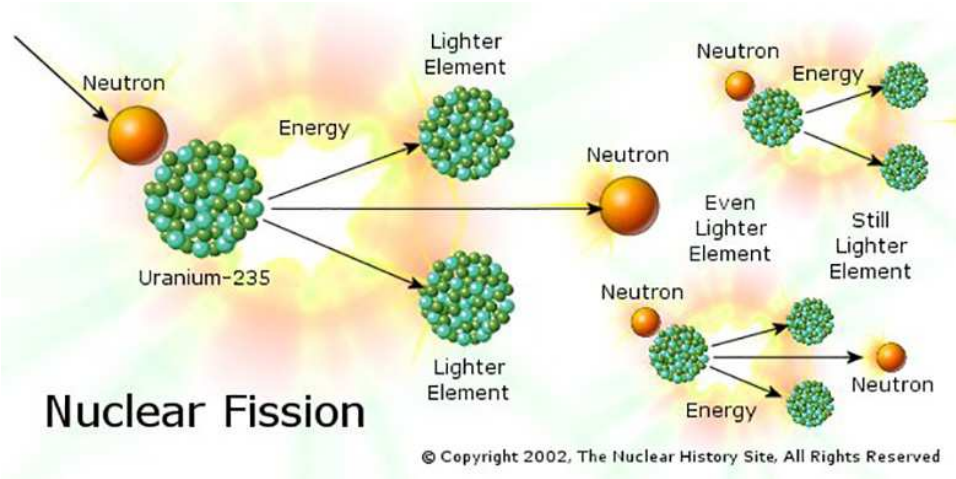
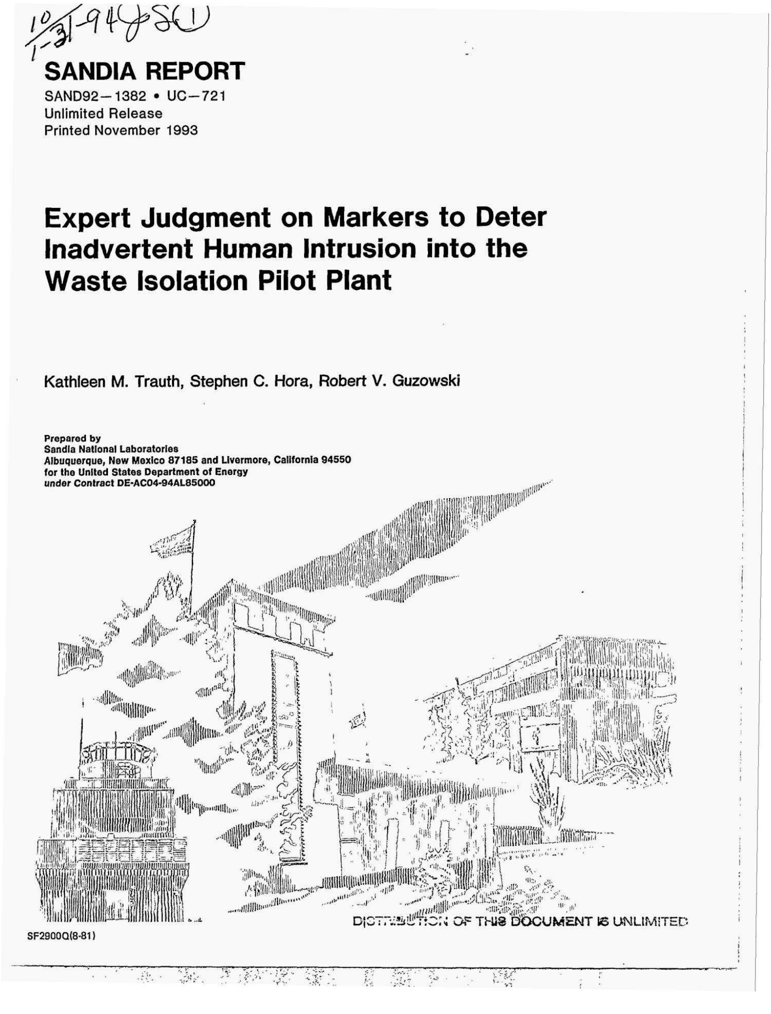
Analysis of Nuclear Energy Production and Its Continuing Viability

Nuclear energy production consists of particles of uranium and plutonium colliding with each other in a controlled environment. As explained by an article published by the Massachusetts Institute of Technology Nuclear Reactor Laboratory: 'When a U-235 nucleus absorbs an extra neutron, it quickly breaks into two parts. This process is known as fission (see diagram below).'



The massive energy released during the collision is generally the desirable product. The production of energy through these means is a continually viable solution to the world's ever-growing energy needs. world-nuclear.org reports: 'Nuclear power is cost competitive with other forms of electricity generation, except where there is direct access to low-cost fossil fuels.' large.stanford.edu paints a similar story regarding the initial building of nuclear power plants, in comparison with otherwise energy generation infrastructure. 'The US Energy Information Administration estimated that for new nuclear plants to go into service in 2019, capital costs will make up 74% of the cost of electricity; higher than the capital percentages for fossil-fuel power plants - 63% for coal and 22% for natural gas, but lower than the capital percentages for other renewable sources - 80% for wind and 88% for solar PV.'

The most pressing downside to nuclear energy production is the necessary care in management of radioactive by-products. As published by Scientific American: ‘Paired with 48 stone or concrete 105-ton markers, etched with warnings in seven languages ranging from English to Navajo as well as human faces contorted into expressions of horror, the massive installation is meant to stand for at least 10,000 years – twice as long as the Egyptian pyramids have survived. But the plutonium ensconced in the salt mine at the center of this installation will be lethal to humans for at least 25 times that long’. Understanding that such great care is both taken and may be expected to continue to be taken, this problem may be considered well-managed. Below: The cover page of a report pertaining to this issue exactly. Sourced from digital.library.unt.edu.



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Expert Judgment on Markers to Deter Inadvertent Human Intrusion into the Waste Isolation Pilot Plant

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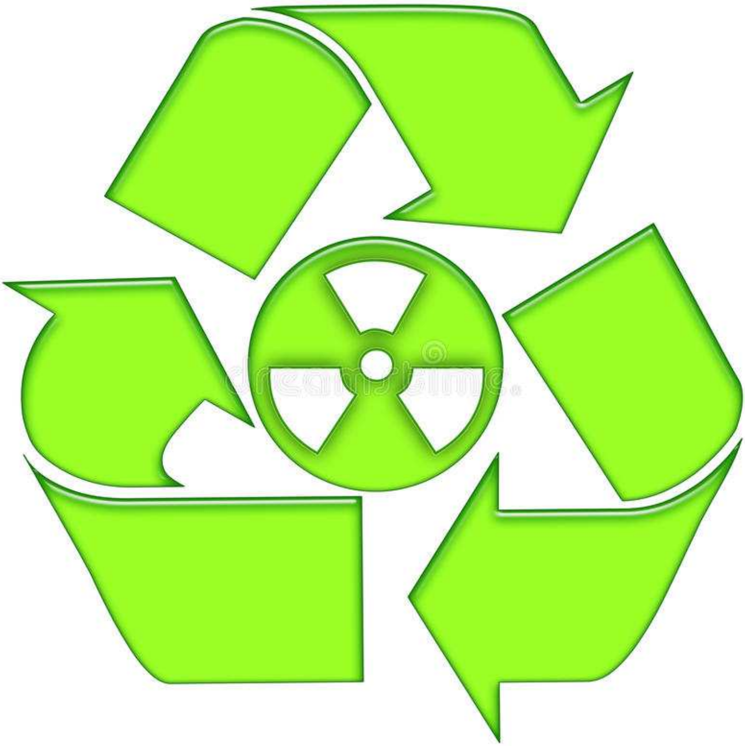
Richard Rhodes writing for Yale Environment 360 explains the practical face of this issue well. ‘Nuclear waste disposal, although a continuing political problem in the U.S., is not any longer a technological problem. Most U.S. spent fuel, more than 90 percent of which could be recycled to extend nuclear power production by hundreds of years, is stored at present safely in impenetrable concrete-and-steel dry casks on the grounds of operating reactors, its radiation slowly declining.’



That recycle-ability is among the strong benefits of nuclear energy production. The process is somewhat self-su cient. Further, beyond the initial production of power plants, no green house gases are emitted in the process. Despite popular notions, ‘nuclear power releases less radiation into the environment than any other major energy source’, as published by Yale Environment 360.

Development of nuclear energy production should continue as is as long as it is sustainable. In a case where it no longer is, we may explore alternative solutions to the existing issues. In particular, we may find novel methods of nuclear waste disposal and re-use. Nuclear waste may be jettisoned into outer space, ideally in a way that ensures that the material does not orbit Earth.