

## **Shielded Fuel Organic Moderated and Cooled Reactor**

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The organically moderated and cooled reactor in Piqua, Ohio was a failure after its ter-phenyl coolant polymerized in the heat and radiation of the reactor. If the fuel were separated from the coolant by a layer of lead or solder to reduce the flux of photons, the radiolysis of the coolant would be greatly reduced. This would permit the production of reactor pressure vessels rated to only a few atmospheres, as well as less extensive containment structures. This might permit siting of reactors in more austere locations. Of greater import, if the reactor were of multiple cast pieces bolted or welded together, then the reliance of the nuclear industry on the few steel works that can supply large pressure vessels would be broken. The total weight of such a reactor pressure vessel with its fuel may not be lighter than an light water reactor as the mass of shielding would be noteworthy. Lead shielding has a fairly low absorption cross section, but a sizable number of neutrons would be lost, increasing fuel costs. Additional issues for study include: heat transfer into the organic coolant, fuel assembly design to ensure additional headspace to account for fission product pressurization, neutron energy spectrum, and performance of the fuel assemblies as a long-term waste form.