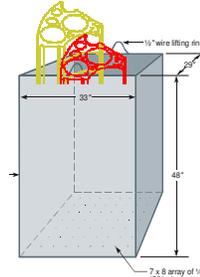


In situ WAXFIX encapsulation of beryllium reactor blocks in a soil vault

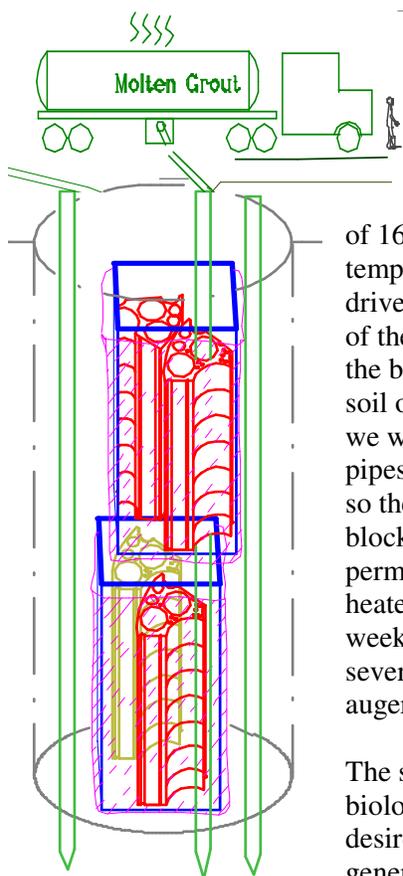
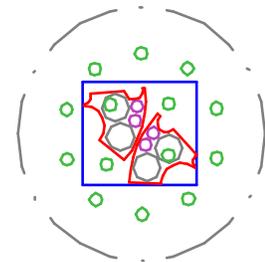
A whitepaper by:

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Beryllium metal reactor blocks from the Advanced Test Reactor were disposed in Soil vaults at the Idaho National Engineering Laboratory in the late 1970's. These blocks were placed in 33 inch by 29 inch by 48-inch tall rectangular metal baskets and dropped from a cask into a 5 to 6 foot diameter auger drilled hole at the SDA.



The hole was drilled to the basalt and two feet of soil was backfilled in the hole. The open top baskets containing two 51 inch tall blocks each were bagged with a nylon reinforced pvc plastic bag as they were dumped from a cask into the hole. The augured holes averaged 12 foot deep and the emplaced baskets were covered with 6 feet of soil.



We propose to completely saturate the soil and fill all the void spaces within the volume of the augured hole with molten WAXFIX grout.

To do this we will preheat the entire soil vault to a temperature of 160 degrees Fahrenheit, (about 30 degrees above the melting temperature of the molten wax.) To heat the soil volume we plan to drive small pointed steel pipes down to basalt all around the perimeter of the augured hole. We will also try to drive pipes vertically through the baskets. We will place heating systems in these pipes and heat the soil over a long period of time. After the soil and the blocks are hot, we will remove the heaters in the center areas and begin filling the pipes with molten WAXFIX. The pipes are slotted every few inches so the molten wax can flow out into the baskets, encapsulate the blocks, and permeate all the soil. The wax is specially formulated to permeate INEEL soil. As the wax reaches the outer circle of holes the heaters will be turned down to low setting to continue the soak for two weeks. After all heaters are turned off the wax will remain molten for several weeks and will fully permeate all waste and soil within the auger hole and 12 inches into outer base soil.

The solidified wax is highly impermeable and resistant to chemical and biological attack. The cooled wax is sticky and malleable like taffy. If desired, the encapsulated waste may be safely excavated without generation of dust.