explosives, relying mostly on the cleaner fusion reaction and producing relatively little radioactivity, are being developed for nuclear excavation. During cratering with these explosives, some of the radioactivity condenses in the split second before a crater forms and is trapped in a puddle of glass below the point of the explosion. Most of the remaining radioactivity filters out of the gases as they escape through the overlying material and is buried in this material in and nearby the crater. A small portion of the radioactivity produced is injected into a dust cloud, becoming attached to the dust particles and falling to earth under the influence of gravity during the first few hours after the explosion as the wind moves the cloud away from the crater. An exceedingly small portion of the radioactivity remains airborne for a longer period, becoming so widely dispersed by the wind and decreased by radioactive decay that it is practically undetectable after a few tens of hours.

Advantages and disadvantages of nuclear excavation

Cost is a major consideration in any excavation project. As a large energy source, nuclear explosives are unrivaled for economy. A 2-megaton nuclear explosive might be 100 times cheaper on a cost per ton basis than the equivalent yield of TNT.

Comparative energy costs

Energy source	Cost per million (10^6) Btu
2-megaton thermonuclear explosive	$ 0.075
Lignite	0.14 to 0.17
Soft coal	0.15 to 0.20
Natural gas	0.20 to 0.15
Water power	0.89
Gasoline	1.50
Electricity ($0.006/kwh)	1.78
Ammonium nitrate	4.50
10-kiloton thermonuclear explosive	8.75
TNT	250.00

Unit costs for nuclear explosives increase with decreasing yield, but, in the energy range as small as several kilotons, they still enjoy a significant economic advantage in comparison to chemical explosives.