

Re: fission question

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sharp@cadence.com (Steven Sharp) wrote in message
news:<3a8e124e.0407231355.15f66c0c@posting.google.com>...

[snip]

> *Are you sure that radiation is the dominant heat loss mechanism from
> the core in that timeframe? These cores were sitting inside
> hemispherical hollows in metal reflectors. The thermal contact may not
> have been great, but there would be some conduction into that larger
> metallic mass, delaying meltdown.*

Horseback feeling from experience with commercial nuclear fuel:

A core such as this, in five seconds, would be fairly accurately treated as adiabatic. That is, practically speaking no energy would conduct out thermally in that time. I certainly have not run any numbers on it. Certainly a power pulse in the 10's of kilowatts range would be very little affected by conduction during the first few seconds.

Probably thermal radiation during the first few seconds would be nearly negligible as well. Just not time for the heat to move around very much.

I'm thinking, though, that a significant fraction of the energy would have gone away as neutrons that didn't interact with the core. The fact that this thing is just barely over prompt would tend to say that there are still a goodly fraction going away, winding up in lab gear, lab personnel, etc. So, the lack of a melt may not be all that surprising, as long as the event is terminated in a few seconds. The lab equipment probably got warm (thermally as well as by induced radiation) fairly quickly.

Socks