

Re: fission question

Source: <http://sci.tech-archive.net/Archive/sci.physics/2004-07/6720.html>

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Date: 07/22/04

Date: 21 Jul 2004 17:02:00 -0700

sbharris@ix.netcom.com (Steve Harris sbharris@ROMAN9.netcom.com) wrote in message news:<79cf0a8.0407041402.163437c7@posting.google.com>...

>

> *Now, having said that, the second interesting thing about the Slotin
> and Daghlian incidents is what DIDN'T happen. The cores didn't melt
> and give a mini-China syndrome, burning globs of liquid plutonium into
> the floor. I've seen a picture of the core after the Daghlian
> accident, and it's perfectly intact.*

That should be "core", not "cores", since both accidents involved the exact same core. Both times the nickel canning was still intact. The estimated yields were 10^{16} and 3×10^{15} fissions. For comparison, that corresponds to the energy of an ounce or two of high explosives (though the fission energy would mostly be released as heat, not kinetic energy).

> *Now, obviously, that didn't happen in either of these accidents. From
> discriptions, it sounds as though the reaction went up to some ungodly
> high power output very fast, but then quit increasing. And didn't go
> past the limit where things melted or vaporized. So where was the
> brake.*

As noted elsewhere, the dominant quenching mechanism was thermal expansion of the core itself.

> *Inquiring minds want to know. I wonder if they had the balls to repeat
> these accidents under control "dragon" type conditions, just to see
> what really DID happen? I'll bet not. If they did, it's still
> classified.*

Well, the unclassified document that I have has a footnote that says:

"The Los Alamos National Laboratory archives include some data and comments about a rerun performed 2 October 1945 to determine the radiation dose received in the accident of 21 August 1945. The yield of the rerun was about 6×10^{15} fissions, but the prompt critical state was not reached. The maximum reactivity of the system during this experiment was about 60 cents above delayed criticality."