



**INSTITUTE FOR ENERGY AND
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SUMMARY OF HEALTH AND ENVIRONMENTAL IMPACTS OF NUCLEAR TESTING IN PAKISTAN

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Test data

Pakistan conducted five nuclear explosions on 28 May and one on 30 May 1998 in Balochistan, using highly enriched uranium as the fissile material. The total yields of the tests are a matter of some debate. The official claim of total yield for the 28 May tests is 30 to 35 kilotons and for the 30 May test is 15 to 18 kilotons. Zia Mian cites independent estimates of the yields on the two days of 10 to 15 kilotons and two to eight kilotons respectively (Zia Mian, "A Nuclear Tiger by the Tail", in M.V. Ramana and C. Rammanohar Reddy, eds., *Prisoners of the Nuclear Dream*. New Delhi, India: Orient Longman, 2003, p. 91). The Nuclear Weapon Archive's page for Pakistan's tests cites a variety of estimates, generally along the lines of the lower estimates cited by Mian ([Nuclear Weapon Archive, Pakistan page](#)).

Radioactivity dispersal and underground pollution

Pakistan's nuclear weapon tests were all underground, tunnel tests. No information is available on venting of radionuclides and no health studies have been carried out (Zia Mian, personal email communication, 2 May 2022). As a result, the complaints of nearby villagers ([Shah Meer Baloch 2017](#)) about a variety of health problems cannot be validated by data.

The distribution of fission products for uranium-235 (the fissile part of highly enriched uranium) is somewhat skewed toward the lighter end of the periodic table than that for plutonium-239. A total yield of the six tests of 20 kilotons gives an inventory of roughly 60,000 terabecquerels of strontium-90 and 70,000 TBq of cesium-137.

Pakistan's inventory of highly enriched uranium in 2020 was about 3.9 metric tons, not including an estimated 100 kilograms that was used in the nuclear weapon tests ([SIPRI 2021](#), Table 10.11 and Note g to that table, p. 406). The radioactivity of the residual uranium would be dominated by uranium-234, rather than the fissile uranium-235, due to the much shorter half-life of the former. The total estimated residual uranium activity would be on the order of 0.2 TBq. (Residual radioactivity amounts estimated by the author.)

References

Mian 2003	Zia Mian, "A Nuclear Tiger by the Tail", in M.V. Ramana and C. Rammanohar Reddy, eds., <i>Prisoners of the Nuclear Dream</i> . New Delhi, India: Orient Longman, 2003
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Nuclear Weapon Archive Pakistan page	Pakistan's Nuclear Weapons Program – 1998: The Year of Testing. Nuclear Weapon Archive Website at http://nuclearweaponarchive.org/Pakistan/PakTests.html , viewed on 10 May 2022
Shah Meer Baloch 2017	Shah Meer Baloch, "The Fallout From Pakistan's Nuclear Tests", <i>The Diplomat</i> , May 29, 2017, at https://thediplomat.com/2017/05/the-fallout-from-pakistans-nuclear-tests/
SIPRI 2021	SIPRI Yearbook 2021: Armaments, Disarmament and International Security. Stockholm, Sweden: Stockholm Peace Research Institute, 2021, chapter on "World Nuclear Forces" at https://sipri.org/sites/default/files/2021-06/yb21_10_wnf_210613.pdf
