

UNDERGROUND NUCLEAR EXPLOSIONS.

Thirty, or just less than one percent, of the events listed in the 1987 bulletins were underground nuclear explosions. Of these, 28 were detected by the Yellowknife array (YKA). An additional 13 explosions, not included in the bulletins but listed by other authorities, took place. Six of these additional events were detected by the array. Table 3 lists the 43 nuclear explosions detonated during 1987; their locations are shown in Figure 4. Table 2, below, gives the total number of explosions for each country (UK tests are conducted at the US test site in Nevada, and are included with those of the USA).

TABLE 2
UNDERGROUND NUCLEAR EXPLOSIONS (1987)

	Total	Detected by YKA
China	1	1
France	8	8
USA (+UK)	14	8
USSR	20	18
All	43	35

As can be seen from the above, the Yellowknife Array has a particularly excellent record of detecting nuclear explosions. The frequency band to which the data are filtered and the spacing of the substations of the Array are well-suited to the detection of explosion P-waves, which tend to be of slightly higher frequency than earthquake P-waves.

The two events in the Soviet Union which were not detected by YKA took place when the array data was not being captured correctly due to hardware problems. The 6 U.S. events missed were small and could in general be detected only by stations within the USA itself; if data from stations inside the USSR had been available (note that the NRDC stations are turned off before Soviet explosions!) it is quite possible that the number of reported Soviet explosions would have been greater. As usual, YKA demonstrates an outstanding capability to detect French explosions in the South Pacific.

In February 1987 the USSR ended the unilateral nuclear test moratorium which it started in August 1985. The number of Soviet tests was slightly higher than the annual average in the years before the moratorium. The USA carried out somewhat fewer tests than the average over the last few years, while the French testing program continued at the usual level. The largest explosion of the year was the single test conducted by China - its yield may well have exceeded the 150 kiloton limit of the threshold treaty signed in 1976 by the UK, USA and USSR (but not by France and China). On the basis of the seismic evidence, there is no reason to suspect that any of the three signatories to the 1976 treaty exceeded the 150 kiloton limit.