If an underground nuclear explosion takes place in a cavity with a radius above a certain minimum value for a given yield level — a known evasion scheme called seismic decoupling — then noticeably less energy is transmitted, or "coupled", to the surrounding rock. In this case, the explosion will appear to be smaller than it actually is, making detection more difficult. The volume of the cavity required to achieve the desired decoupling increases with the explosion yield[1]. The largest cavities that have been constructed in hard rocks are small compared with the corresponding ones in salt.

There is a widespread agreement among forensic seismologists that the existing technology probably permits the construction of cavities of the size and strength required for repeat clandestine nuclear testing of nuclear weapons of up to 1 or 2 kilotons in yield. The diameter of a cavity in salt to muffle a 5 kiloton explosion is at least 86 m, approaching the height of the *Sky Dome*, a new sports stadium in Toronto (Figure 3). Massive excavations required for decoupling larger nuclear tests would be both costly and technologically difficult, especially when the need for concealment of such activities is taken into consideration. The clandestine construction of a stable cavity sufficiently large to muffle a 10 kiloton explosion is not feasible[2]. Even if the cavity construction is successful, repeat clandestine testings of a few kilotons or more in a fixed cavity carry a high likelihood of being detected and well located, attracting unwanted attention from a monitoring party.

For historical reasons, the Soviet Union has been extensively studied in the West for assessing the future seismic monitoring requirements for that country. The U.S.S.R. has a landmass much different from that of the Western U.S.A. where the Nevada Test Site is located. While verification of treaty compliance today requires a global perspective to seismic monitoring that goes well beyond the national boundaries of the two superpowers, the Soviet Union serves as a convenient model for discussion purposes.

Experience gained by the U.S.A. and a number of other countries suggests that a seismic network of stations located entirely outside of the Soviet Union would be able to detect well coupled explosions with m_b as low as 3.5 anywhere within that country[3]. The associated source *identification* threshold is m_b 4.0, which corresponds to a well-coupled explosion with a yield of 1 kiloton. With an additional in-country, 25-station monitoring network, the detection threshold lies between m_b 2.0 to 2.5. The associated source identification threshold can be at least as low as m_b 3.5, depending on the way treaty provisions are negotiated to handle chemical explosions. Compared with the 0.5 m_b gap between the detection and identification thresholds for teleseismic events, the corresponding gap for small regional events is conspicuously larger.