



INTERNATIONAL ATOMIC ENERGY AGENCY
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COLLEGE ON MEDICAL PHYSICS

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Counting Equipment for Monitoring Contaminated Food

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Counting equipment for monitoring contaminated food

A national food monitoring scheme works at different levels (see attached diagrams):

Level 1. Precision gamma spectrometry

Determines which radioisotopes are present, provides calibrations, resolves problems. Equipment shown is typical but other arrangements are possible, e.g. a rack of NIM modules, an analyser board in the PC instead of multichannel analyser (MCA), etc. Liquid nitrogen needed to cool HPGe detector. Equipment needs expertise to set up and use. Expensive. Could be in a university lab where it will be well looked after and may be used for other purposes also.

Level 2. Routine gamma spectrometry

NaI has lower energy resolution than HPGe but can easily resolve Cs, iodine, and K radioisotopes. Sensitive but robust. No need for liquid nitrogen. Suitable for a national control lab (Ministry of Food or Health) or major food producer or importer but too complex for unskilled use. Needs trained professional supervision.

Level 3. Checking station

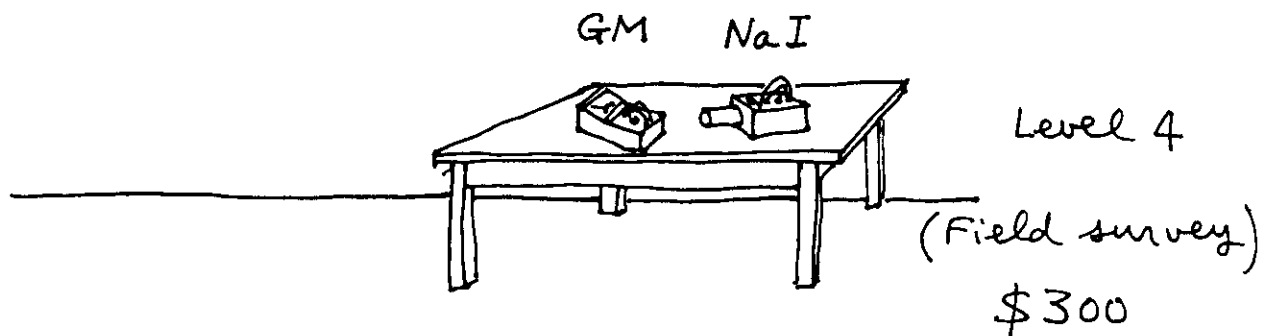
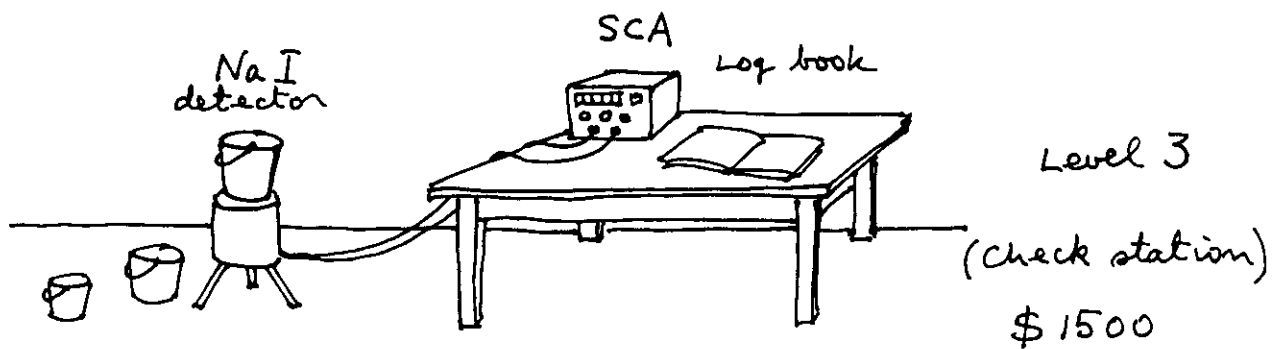
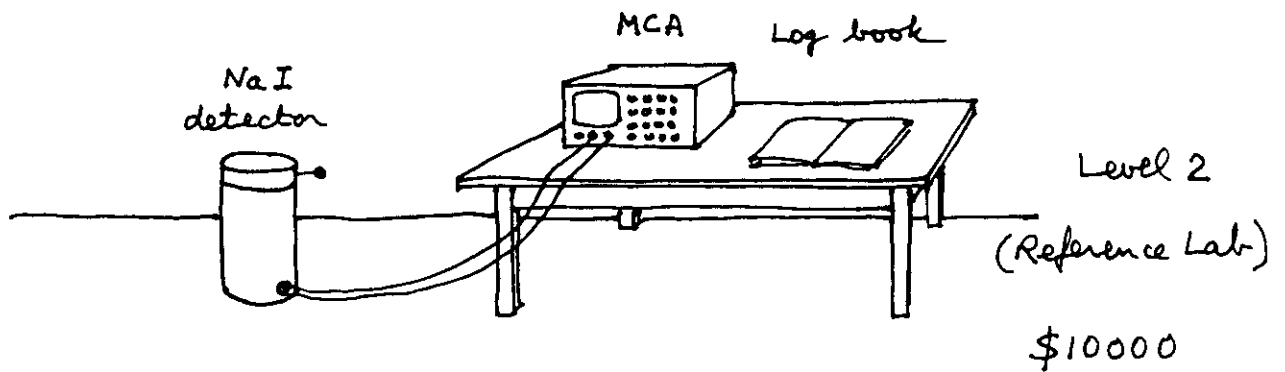
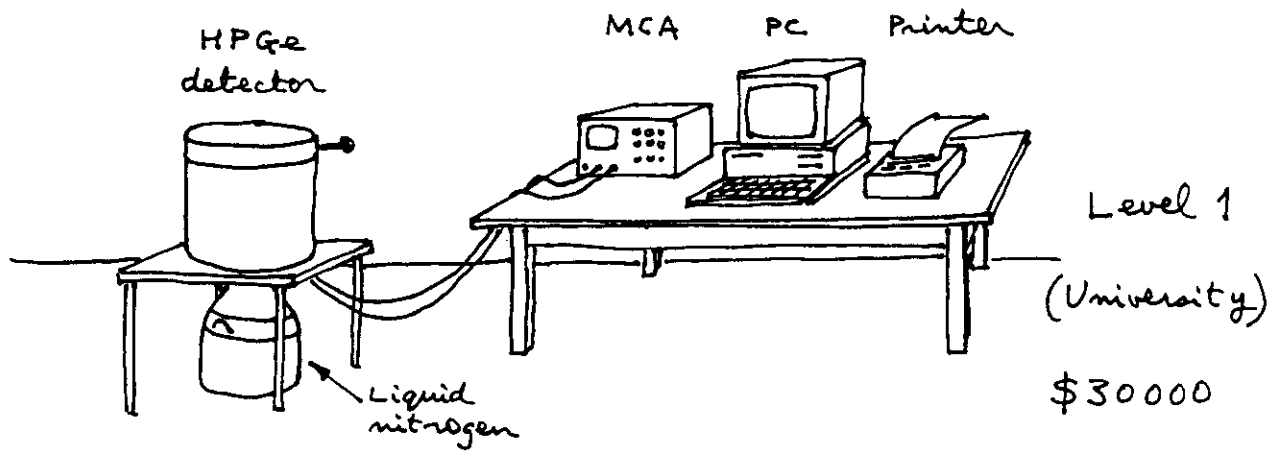
A simple single channel analyser (SCA) with unshielded or partly shielded NaI detector may be used at ports of entry or by minor food firms. Microprocessor-controlled SCAs are available which give activity in Bq/kg directly, with indication of statistical accuracy. Occasional expert advice and calibration needed.

Level 4. Portable detectors

Useful in early stages of an emergency if contamination is high (1000 Bq/kg) but not sufficiently sensitive and accurate for regular use. Special models available for testing bulk liquids (milk). Main use is sorting samples when more accurate instruments are overloaded.

Note 1. All the above equipment measures gamma-emitting radioisotopes only. Other equipment would be needed for alpha or beta emitters. These were widely present after above-ground weapon testing but after a civil accident are significant only in the immediate surroundings.

Note 2. It has been suggested that counting equipment used in hospital nuclear medicine departments could be used to monitor foodstuffs. This is being investigated by WHO.



Instrumentation for measuring
radioactivity in food.

