How to set up a home, or community food and environmental testing lab, for radioactive contamination.

(Do not just rely on this document, do more research, it is only meant to be a basic guide. This is the forth draft of this free guide. Any suggested improvements from the community are welcome. **Updated 19/05/2014**)

Why purchase radiation food testing equipment? The technology to deal with the Fukushima Nuclear Disaster hasn't been created yet!

1. The Fukushima Nuclear disaster is much worse than you are being told.

2. Multiple nuclear reactors have melted down, and multiple fuel cooling pools that contained multiple old reactor cores have been vaporised, or are still releasing large amounts of contamination into the atmosphere and Pacific Ocean.

3. The Northern Pacific Ocean, plus large areas of Japan, Alaska, Western Canada, Western and Central USA, and Eastern Russia, have been significantly contaminated with radioactive fallout. They are still being contaminated by radioactive fallout from Fukushima.

4. Radiation bio-accumulates, particularly in meat, dairy and seafood, grown and harvested in radiation contaminated areas.

This is how governments have deceived the public about food safety radiation levels worldwide.

They first release an article like the one below. I am using the EU as an example here.

“EU boosts food import controls after Japanese nuclear disaster. The European Union is to step up controls on food imports from Japan in the wake of the nuclear accident at Fukushima – but stressed there was no evidence that consumers in the region were at risk from radiation-contaminated food.

The EU ruling insists that all products from these prefectures are tested before leaving Japan and said they will be subject to random testing in the bloc. Japanese authorities will have to provide a declaration confirming products do not contain radioactive elements – called radionuclides – that exceed EU maximum levels. The Commission highlighted radionuclides iodine-131, caesium-134 and caesium-137."

http://www.foodproductiondaily.com/Quality-Safety/EU-boosts-food-import-controls-after-Japanese-nuclear-disaster

This makes you feel warm and cosy inside, because you think your government is looking after you and your family. This article "EU boosts food import controls after Japanese nuclear disaster" is a clever deception because they then proceed to quietly raise the EU maximum safety levels by 20x for caesium-134 and caesium-137. Governments worldwide have used this same tactic.

http://foodfreedom.wordpress.com/2011/04/04/eu-secretly-ups-cesium-safety-level-in-food-20-fold/

They then tell the public everything is testing below safety levels, nothing to worry about!

Here is another example, Japan this time. http://www.youtube.com/watch?v=oc6FPIK1VaY

Ingested radiation from contaminated food radiates body cells with high doses of radiation for long periods of time.

So what does this mean?

You can't rely on governments, so it is important for your family's health and safety, that you take the time and effort to research this subject. In summary, for your family's safety, only purchase food and goods that are not contaminated. Research dietary systems that help remove, or protect your body from radioactive contamination.

An Oncologist in Japan Dr. Atsuo Yanagisawa has been doing ongoing research on the Fukushima Nuclear Disaster site workers, and found he is getting very good results with Liposomal Vitamin C. It appears to be healing a lot of radiation damage to their bodies. **Liposomal Vitamin C is a combination of vitamin C and lecithin.** This combination seems to improve the up take of vitamin C by 80%! It maybe a good idea for you and your family to research taking this to fortify against the effects of these radiation clouds coming through.

He has been trying to encourage the Japanese government to educate their people about this treatment.

http://www.youtube.com/watch?v=Rbm_MH3nSdM&feature=channel&list=UL

Making your own **Liposomal Vitamin C,** http://www.youtube.com/watch?v=F2eqfiTxDwg&feature=related

Flax seeds - A study from the Perelman School of Medicine at the University of Pennsylvania found that flaxseed may help protect lungs against the damage caused by radiation exposure. The researchers believe that flaxseed might also have a role in protecting other healthy tissues and organs, before exposure to radiation. It can even significantly reduce damage even after exposure.

http://www.greenmedinfo.com/blog/protect-yourself-radiation-flaxseeds

The only real way to have confidence that what your family is eating is safe, is to test food and goods yourself. Here are the steps you need to take to set up a home, or community food testing lab for radiative contamination.

If you can't afford the type of equipment mentioned in this document, the latest International reports on food contamination detections can be found at "The Food Lab", http://sccc.org.au/archives/2861. If you do purchase good food testing radiation contamination equipment mentioned in this guide, look at the old pre Fukushima radioactive food contaminations safety levels, as a guide as to what is possibly safe.

You really need a scintillator spectrometer or better, to properly test food and liquids for radioactive contamination, plus skills to work this equipment properly. Food contamination is specified in Becquerels per Kilogram or Litre, and the safety level of contamination can vary from a fraction of a Bq to 1000 Bq/kg + range, depending on the radioactive isotope. The safety levels very from country to country.

Should You Build Your Own DIY Food Testing Unit, or Purchase A Commercial Unit?

Asses if your level of food contamination risk warrants purchasing this type of equipment.

Geiger counters are not sensitive enough to detect the low levels of radioactive food contamination, that may present a health risk. Two parallel Geiger counter SBM20 tubes which are more sensitive than the average Geiger Counter, can measure down to 2000 Bq/kg activity. This is a factor of 100, too insensitive for detecting radiation in food that could cause health issues. The scintillator equipment describe here, can detect radiation contamination in food at very low levels. Also the scintillator equipment needs to be in a lead shielded test chamber with the food sample during testing. The lead shielding is used to screen out background radiation noise.

After doing research on radiation food testing equipment, I found equipment ranging in price from $2,000, to $18,000.

Beeresearch GS-1100A + scintillator price $2,000, this unit is the cheapest of the units featured in this guide, it is supplied with free software. It will provide you with individual isotope identification, and contamination levels, like the more expensive AustralRAD Becquerel Monitor described below. You will also need a computer to use it. Building a lead and copper shielded testing chamber will also be required. A DIY testing chamber may cost around $300+ in lead and copper. It will take time to set up and learn how to use the equipment, and software. You will find Info here on the Beeresearch GS-1100A

Polimaster PM1406, price $2,590.00 + $75 shipping, and lead shield is extra. Interestingly, with this unit you can adjust the food safety level in the testing software provided, to your countries safety standard. A country's safety standard depends on how many citizens that country is willing to sacrifice to their nuclear God.

Demonstration video.

http://www.youtube.com/watch?v=9HkaTHgfeE0

The Polimaster PM1406 appears to be is a nice compact unit, and easy to use. If you were considering purchasing this unit, I would suggest also purchasing the compact lead shielded container, to improve sensitivity.

With the lead shield, this unit should be able to detect other radioactive isotope contaminants, other than just Cesium. To do this Polimaster would need upgrade their testing software.

The Beeresearch kit is more sensitive than the Polimaster, but there is a fair bit of work and skill involved in setting up the DIY Beeresearch kit, to get it all working well.

With shielding, the Polimaster PM1406 may work out to be marginally more expensive than the Beeresearch unit, but the Polimaster should be easier to use, and calibrate.

http://shop.polimaster.us/food-contamination-monitor-pm-1406/

Berthold Australia LB 200 rapid food monitoring, price $11,000, here is the PDF info sheet. The Berthold Australia LB 200 Rapid food monitor is probably the easiest to use. It just tells you the Becquerel contamination amount on a screen, and also comes with a lead shielded testing chamber.

Gammasonics AustralRAD Becquerel Monitor, price $18,000, here is the PDF info sheet. The Gammasonics AustralRAD Becquerel Monitor provides you with an indication of individual isotope contamination levels. It also is supplied with a lead testing chamber, computer laptop and software.

Berkeley Nucleonics Sam 940 2x2 model is usable as a environmental, and food tester, $11,800. A portable lead + copper test chamber is available at an extra cost.

http://www.berkeleynucleonics.com/products/model_940.html

(If you suggestions regarding food testing units to ad to this guide, post them into this forum for consideration. http://enenews.com/forum-post-radiation-monitoring-data-april-30-2012-present)

STEP 1	**WHICH UNIT TO PURCHASE?**
What is a scintillator ? **1.** http://www.youtube.com/watch?v=h0dF2FUo5WU&feature=player_embedded 2. http://www.youtube.com/watch?v=pqIKs5lH4WE&feature=player_embedded	Firstly you need to make a choice on whether to purchase a commercially made food testing unit, or build your own. Commercial units tend to be expensive. This means the unit maybe only affordable through a group purchase. Proceed to step two if you are considering, or going to purchasing the DIY Beeresearch kit, to see what is involved in getting it all working properly.
STEP 2	**WHAT YOU GET**
Why I choose the Beeresearch Gamma Spectacular product to build a DIY food testing unit. “The traditional equipment used for gamma spectrometry costs tens of thousands of dollars, and usually consists of multiple nuclear instrument modules or NIM’s, now, due to smart software developed in Australia, the cost of doing gamma spectrometry is within reach of any student, teacher or amateur wanting to explore the fascinating art of Gamma Spectrometry. This greatly reduces the price	There are two packages that will do the job. You will need to place a AU$500 deposit on ordering, and it may take several weeks before it arrives. This will depend on scintillator availability. This first package uses a 2” x 2” inch scintillator crystal, it is the most expensive of the two packages I suggest you look at. It is priced at present at around $2250 plus freight. These prices can very, and depend on what scintillator model is available at the time. **Package one, with 2” x 2” Crystal Scintillator** This kit is priced around $2250. (I suggest purchasing this package.) 1 x GS-1100A 1 x 2" NaI(Ti) Detector. 1 x SHV cable 1 x PVC Carry case. 1 x Freight

of ownership, and at this price, and with the correct package choice, can provide detection of individual isotopes for identification.”

NOTE: Having some technical skill will be a great aid to getting this all working effectively! So if you consider yourself not very technically minded, get someone with some technical skills to help you.

Package two, with 1.5” x 1.5” Crystal Scintillator

It uses, a 1.5” x 1.5” inch scintillator crystal, this package is priced around $2000 at present.
1 x GS-1100A
1 x 1.5” NaI(Ti) Detector.
1 x SHV cable
1 x PVC Carry case.
1 x Freight

What's the difference besides price? The larger 2” scintillator crystal in the more expensive package is more sensitive. This means detecting radiation contamination in food will be a lot quicker. Also, the larger scintillator crystal provides a broader range of isotope detection. After you decide which package to purchase proceed to step 3. Again this may mean a group purchase.

To purchase the Beeresearch unit contact Steven Sesselmann on 0412 422 318 or email steven@beejewel.com.au

STEP 3

HARDWARE AND SOFTWARE

Why a scintillator is so delicate.
http://www.youtube.com/watch?v=kRVpm6JPibw

How a scintillator works
http://www.youtube.com/watch?v=DNnzHQ5p0nc

TIP: The alternative free Theremino MCA software maybe easier for some people to set up and use. To see the English version of the Theremino site, click the Americam flag translate button at the top right of the page.

Both the PRA and the Theremino MCA programs are being constantly inproved, so keep an eye out for updates.

< This is what will arrive in the mail. The large silver tube is the scintillator. You will need a Windows, or Mac computer to connect it up to. For those using the Linux OS you should be able to get the software working using Wine.

The small black and silver box in the suitcase, is the Gamma Spectacular control box that makes it all work. You connect this box to the computer via a USB cable and audio cable, both supplied. The long cable is a BNC cable that connects the control box to the scintillator model you choose.

< It is delicate, so handle with care. A drop or a bump can damage the detecting crystal. Read the set up manual that comes with the package. You will also need to download and install one of these free Multi Channel Analyser (MCA) charting and analysing software programs, **PRA, Theremino MCA** or **BecqMoni**
PRA - http://www.physics.usyd.edu.au/~marek/pra/index.html
Theremino MCA- http://www.theremino.com/downloads/radioactivity
BecqMoni - http://www.gammaspectacular.com/software-downloads/becqmoni

If you use PRA, the Intune software can also help with set up, http://www.physics.usyd.edu.au/~marek/intune/index.html

Here are two Youtube help videos.

Video 1, Basic set up of the GA-1100A USB control box with the PRA software.
http://www.youtube.com/watch?v=xvI-gWuAiko&feature=youtu.be

Video 2, PRA Energy Calibration. This is for fine tuning the Beeresearch unit so it accurately positions the isotope peaks in the PRA chart. This is so you can identify them correctly.
http://www.youtube.com/watch?v=qGQJr7RtBL8&feature=youtu.be
A check source is a little piece of radioactive material of a known isotope

Warning if you use a smoke detector calibration method do not pull the unit apart. Use it as it is. An unshielded Americium in a smoke detector is potentially dangerous! Do not leave this type of smoke detector around so children can accidentally play with it.	type and energy output, sealed for safety, on a small disc. A Cesium 137 check source for software calibration will need to be purchased from another supplier. This could cost another US$120 +. I used an old faulty ionization smoke detector, and some Low Salt to get calibration peaks. Low Salt, can be purchased from most supermarkets, and has a small amount of naturally occurring radioactive Potassium (K40) in it. It has a gamma energy peak at 1460 keV (kilo Electron Volt). An ionization smoke detector uses Americium 241 with a gamma radiation energy peak at 60 keV, plus it has a 26 keV X-ray peak. These items strategically placed in the shielded testing chamber next to the scintillator crystal, provides well spaced peaks for PRA software peak calibration. When calibrating, placing some extra lead shielding in front of the ionization smoke detector will tone it down a bit. This is because the amount of Gamma radiation Am-241 releases, overwhelms the chart compared to K40. Dried clay may be an alternative safe and cheap calibration tool, see the chart images under testing results step 7.
STEP 4	**CONNECTING IT ALL TOGETHER**
TIP: If you are using a desktop computer, plug the supplied audio lead into the blue line audio input socket at the back of a desktop computer. If you are using a laptop computer, you will need to plug the supplied audio lead into the microphone input. Be careful, use a torch and magnifying glass to make sure you are plugging the audio lead into the microphone input and not the speaker out socket. You will see a microphone symbol next to the correct socket. I would suggest placing a coloured sticky dot above the socket, so you don't need to do this again. **TIP:** You will need to let the equipment warm up for at least 30 minutes before attempting calibration.	This is what it looks like with the Gamma Spectacular control box and scintillator connected to a laptop computer, with the PRA charting software installed, and charting on the laptop screen. This is minus a lead shielded testing chamber, which you will need to build separately. http://www.gammaspectacular.com/image/data/countinglab.jpg Always have the computer switched off at the wall before connecting it all together. Once the computer is powered up and the blue light is showing, turn the Gamma Spectacular voltage switch up to the recommended operational voltage for your model of scintillator. The information on this setting will come with the paperwork supplied with the kit. The Gamma Spectacular control box switch position, indicates the scintillator bias voltage, in hundreds of volts. Here are is a video to help set up the software. http://www.gammaspectacular.com/videos/how-to-setup You can also post questions in this forum. http://www.gammaspectacular.com/forum You will need to get your sound levels right to get this equipment working properly. I suggest you start out with 100% gain if you use the line input socket, or 10dB of boost on a microphone input socket. If you have too much gain, the pulses will be distorted, or if you don't have enough gain, there won't be enough pulses detected. It may take some experimenting to get this right. Use the Intunes software to view your recorded pulses and get your gain level right. It should place the peak of the scintillator pulses somewhere between 40 to 60 arbitrary units. Arbitrary units are the units used by the Intune software to indicate volume level.

People have installed better sound cards than the ones built into their computers, to get better results. Some computer inbuilt sound systems may not produce a good enough pulse quality.

If you can set your sound card to 96K samples per second or better, do so. It will improve the quality of the pulses, and the test results.

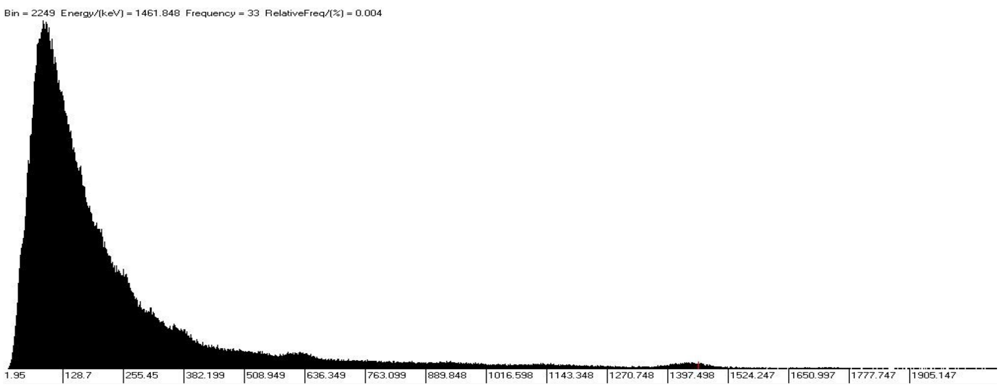
STEP 5

BUILDING THE TEST CHAMBER

TIP: Having the equipment set up in a very temperature stable room will significantly enhance the accuracy of isotope peak detection.

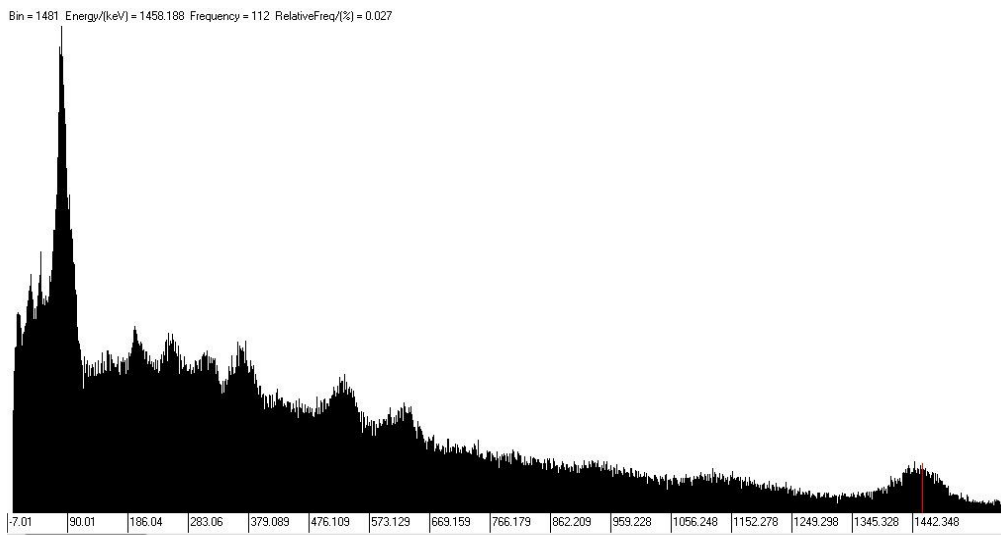
If the temperature in the testing environment varies too much during the testing process, you will get peak drift. This will make it difficult to accurately identify isotopes.

A good lead testing chamber is essential to get the best detection sensitivity out of the equipment. Think of background radiation as noise. The lower the noise the more likely you are to hear the sound of a radioactive isotope's whisper.



The chart above is of 50 grams of dried clay, tested without shielding.

The test chart below is the same sample tested with Lead shielding. See the detail and radioactive isotope peaks that didn't show up in the test chart without shielding? Imagine if this was a food sample!



Most clays have some natural radioactivity in them. Dried clays can be a good resource to test the sensitivity of your set up.

The large peak around 80keV showing in these charts is a test chamber artefact, caused by natural background and sample Gamma radiation passing through the lead shielding. Secondary X-rays can be reduced by installing a 3 to 4mm copper inner liner. The copper layer shields your scintillator from this 80 keV Lead X-ray test chamber artefact. The tests above were done without any secondary copper shielding in place.

This is a photo of a basic built lead shielded test chamber, with a 15mm thickness of lead.

Photo by http://enenews.com member Spectrometising. This is an ideal test chamber with very thick lead, plus a inner copper liner for shielding.

Lining the food testing chamber with a copper metal inner layer helps to shield your detector against secondary X-ray detection produced by Gamma radiation hitting the lead layer.

WARNING: If you do build a lead food testing chamber, make sure you don't have the lead lid rubbing against lead, creating lead dust as you open and close the lid. Seal all cut edges and exposed surfaces with thick paint or another layer. I used thin Aluminium sheeting. If lead gets on your food it is toxic.

< Here is a photo of a basic lead testing chamber with no copper liner. It has a plastic liner and lip, plus a metal tray lid to protect against lead contamination.

The rolls of lead sheeting to build this basic testing chamber, with a 15mm thickness, costs around AU$300.

There is an art to building a good test chamber. Most people build a graded chamber. A graded testing chamber can consists of a very thick outer lead layer, with thinner inner layers of cadmium, copper, tin or aluminium, and plastic. Most people just settle for lead and copper.

<Here is an ideal lead testing chamber made from roles of plumber's lead, plus a copper inner layer to soften the impact of the secondary X-ray energy. This places the X-ray energy outside the equipment detection. The cost of building this ideal lead and copper based testing chamber could be nearly as much as the rest of equipment! This is a testing chamber on steroids. :)

Lead is expensive and toxic, so use rubber gloves and a mask when handling or touching it. Wash your hands well after touching it. Keep the kids away. I suggest if possible, you build the testing chamber outside the house, and only bring it inside when it is finished. Because of the massive weight factor, lifting it once finished, will be an issue you will need to take into consideration before you build it.

Once the chamber is built, seal the lead with paint or another metal cover. You can purchase sheets or rolls of plumber's lead which are already painted. Remember to seal the cut edges. The walls of your testing chamber will need to be at least 10mm (1/3") thick. The thicker the better.

There is an environmental friendly alternative to using lead as a testing chamber. Weight for weight, water is as good a shield as lead. Water is not as dense as lead, so the testing chamber based on water will be a lot bigger. Water is a lot cheaper that lead, but you will need to use de-mineralised water, or filtered rain tank water.

Building a very effective water based testing chamber, at a small cost compared to lead, makes a lot of sense. For those on a budget or who wish to be environmentally friendly, this may be the choice. Opposite is a 240 Litre water shield I built. You need a strong floor, because this equates to 240 kg weight on the floor.

This is an experiment to see if it is as effective as a lead shield. It cost $60 in parts + water. The water should be de-mineralized, an extra coast. Although tank water may be used if it is not contaminated with fallout. The best I could achieve with just a pure water fill was to screen out half of normal background. A 15mm thick lead test chamber provided much better shielding, reducing background by 9 times.

If you experiment with this water shield idea, be very careful. If any of your equipment gets wet, or your scintillator, this would turn out to be a very expensive experiment.

So far I have not achieved the results I expected experimenting with this idea. Also, not everyone would want an object this big in their kitchen.

It is also possible to build a small portable lead testing chamber like the one photographed here at "Tokyo Kids and Radiation", which is an 11mm lead shielded well, built from rolled sheet lead. A 225ml marinelli beaker and 2" NaI probe will fit inside it.

https://sites.google.com/site/tokyokidsradiation/_/rsrc/1325866762870/config/pagetemplates/tools/RIMG0118.JPG?height=240&width=320

STEP 6

TESTING YOUR FOOD

Here we have the Marinelli breaker full of coconut sugar, with the scintillator inside the test chamber.

You need to have marinelli beakers to get the best test results, because this places the food or liquid sample for testing all around the scintillator crystal. This beaker design maximises the ability of your scintillator to detect radioactive contamination.

< Here is a picture of a marinelli beaker. See it has a central well that the scintillator slides into, placing the testing material all around the scintillator crystal.

I built my own marinelli beakers out of some round 1 litre plastic screw top containers. I cut out the bottom with a hole cutter to make a tight fit for some plastic biscuit containers, that just happened to be the right size to fit snugly over the scintillator tube. Then sealed the joins with silicone. They are quite a large beaker design. With larger sample amounts, you are more likely to pick up contaminated items in a shorter period of time. You can purchase marinelli beakers from suppliers off the Internet, and on eBay.

Being able to test larger amounts can also help compensate for the fact that you may only be able to afford to build a testing chamber with a small amount of lead shielding. If an item is contaminated, a larger amount will radiate more radiation. Blending up a sample and dehydrating, can improve testing results. Blending helps by allowing you can to pack more material into the marinelli beaker. Dehydrating a sample makes any contamination that is present more detectable, because it removes water.

< I choose this open top shielded test chamber design opposite. This design allows the placement of larger test objects around the scintillator, minus the marinelli beaker.

Once all the equipment is set up, place your scintillator into the test chamber with an empty marinelli beaker in place, run a test for at least 24 hours to get a good chart of your normal local background. This will be your bench mark against which you compare your other testing results. This is your background chart. It will be wavy, as you can't screen out all the background influence. I suggest you get a clean piece of transparency, and place it squarely against the left hand bottom corner of the computer screen. Then trace out the peak outline of the background chart on your computer screen.

Once you start testing food, small peaks that may indicate you have detected radioactive contamination in a food sample, may not be easy to see without a comparison. Place that traced background outline sheet against the computer screen and compare the screen chart with the background trace. The computer screen chart will shine through. For small peaks showing above normal, this technique will help you see them more clearly.

TIP: If you have an object you want to test that won't fit in a marinelli beaker, to protect your scintillator from contamination, wrap the probe in some cling wrap plastic film, or use a spacer. Then place the sample as close as possible, or touching the protected scintillator probe.

WARNING: Only place room temperature samples next to the scintillator. Hot or cold samples could damage the scintillator crystal.

WARNING: Your scintillator probe can only be immersed in liquids if it has water proof protection.

If you get a sample that is significantly contaminated above normal background, your PRA chart will be showing peaks that will be significantly larger. You will not need to use the paper outline technique. The charts in step 7 show this clearly.

Theremino and BecqMoni MCA software have background level comparison features built into the software programs. I often test a sample, with two or more of these MCA programs at the same time. Each MCA program has its own advantages.

The longer you leave the sample under test, the more likely you are to pick up small amounts radioactive contamination showing as peaks in the test chart. To detect small levels of food contamination, running a test for 24 hours can be a good idea.

STEP 7

TESTING RESULTS

TIP: Don't change the PRA settings while you are in real time data acquisition, or it may crash the PRA Height Histogram real time charting.

TIP: If something is radioactively contaminated, the larger the test amount you use of food or liquid, the faster you test results will be. The smaller the quantity the slower the detection results, unless it is very radioactive, like the radium clock dial.

TIP: In your PRA charting software view settings menu item, set the "Counting Rate Histogram" to 1 second in its settings box.

Then you can use this feature like a very sensitive Geiger counter. If you get familiar with this feature, it will give you a pretty good idea if something is significantly contaminated, just by observing the counts per second peak. It is the small rectangular box centred in the screen shot opposite. >

It can be turned on by clicking the PRA menu item "View" then "Count Rate Histogram".

TIP: Keeping the equipment running constantly will help keep the calibration and settings stable.

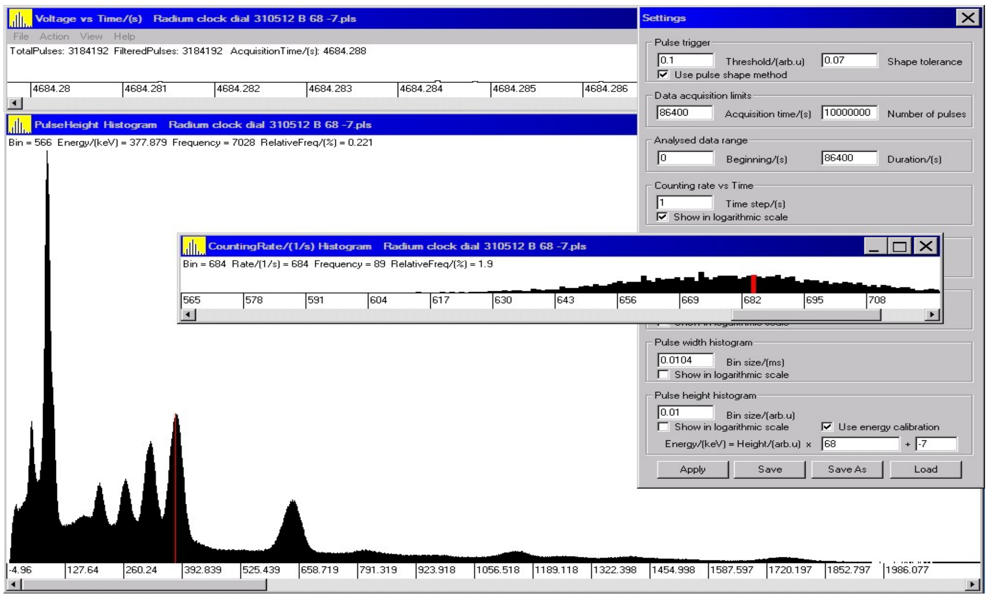
TIP: POTRBLOG's Ingestible Radioactive Caesium Limits Given In Becquerels per

In its simplest form, you don't need to know every radioactive isotope, and where it places its peak on the chart. If you see a peak that is not in your normal background chart, it is probably not safe to eat. Determining this will come form experience.

Be aware that this unit can have some temperature drift in cold weather, so keeping it temperature stable is an advantage. Running it all the time and wrapping the Gamma Spectacular control box in a sock can help keep it temperature stable in cold weather. Remove the sock when the room temperature rises. Having the equipment situated in a temperature stable room would be ideal.

If you need assistance in understanding your charted results, you can post your test results to the enenews.com forum link below. Alternatively, you might just like to let everyone else know what you have found. http://enenews.com/forum-post-radiation-monitoring-data-april-30-2012-present

Here are a couple screen shots showing off the charting features, and isotop identification. This is a chart of a radium clock dial, kindly loaned by enenews member Spectrometising. Yes, it is that radioactive, and they did use it as jewellery. **(Click image to see larger image in your web browser)**



Kilogram.
http://www.youtube.com/watch?v=Ssyt_CSea0M

TIP: If you also own a Geiger counter, use it to screen everything that comes into your house. If your Geiger counter detects radiation on food, it is highly contaminated, and should not be consumed.

If the Geiger counter detects food contamination, there is no need to test it with your scintillator, except if you want to know what is on, or in it.

Read this free Geiger Counter Use Guide.
http://technologypals.com.au/wp-content/uploads/2012/03/Using-a-Geiger-Counter-to-test-food-for-Radioactive-Contamination.pdf

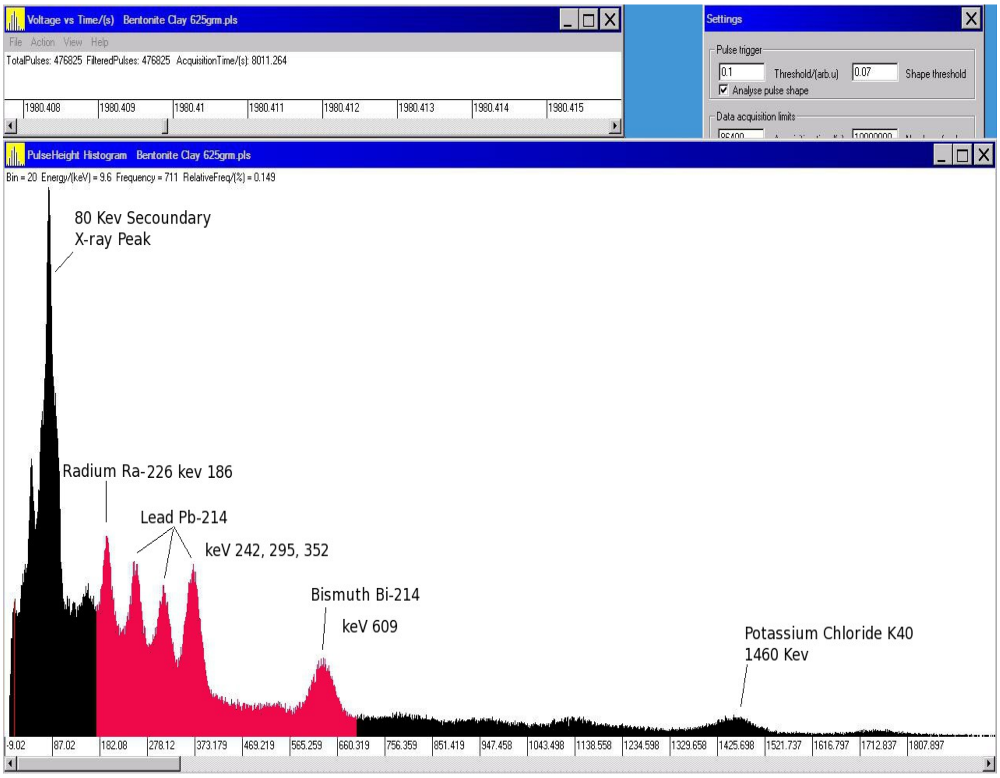
Calculating the Becquerels per Kg or Litre.

If you have a calibrated check source, with a known output in counts per second, you can work out the efficiency of your scintillator tube. Knowing the efficiency of your scintillator tube allows you to calculate the amount of Becquerels in a sample.

To work out the efficiency of your scintillator, place the calibrated check source in the test chamber next to the front of the scintillator tub. Let it count for a set time.

Highlight the peak created by the check source, like it is shown in the Zeolite chart, to get the total count for that peak. To do this, click a black area of the chart, that is the start of the peak, and when you see the red marker in the correct spot, press keyboard letter **b**.
Click the end of the peak and when you see the red marker in the correct spot, press keyboard letter **e**.

The chart below is of a 625 gram sample of Bentonite Clay. The very large peak on the far left in this chart around the 80 keV mark is not from the Bentonite clay, but secondary X-ray artefacts created from the sample, and background gamma radiation, passing through the lead shielding of the test chamber. A 3mm thick copper liner, or more, placed in the lead shielded test chamber, would help remove these secondary X-ray artefacts.

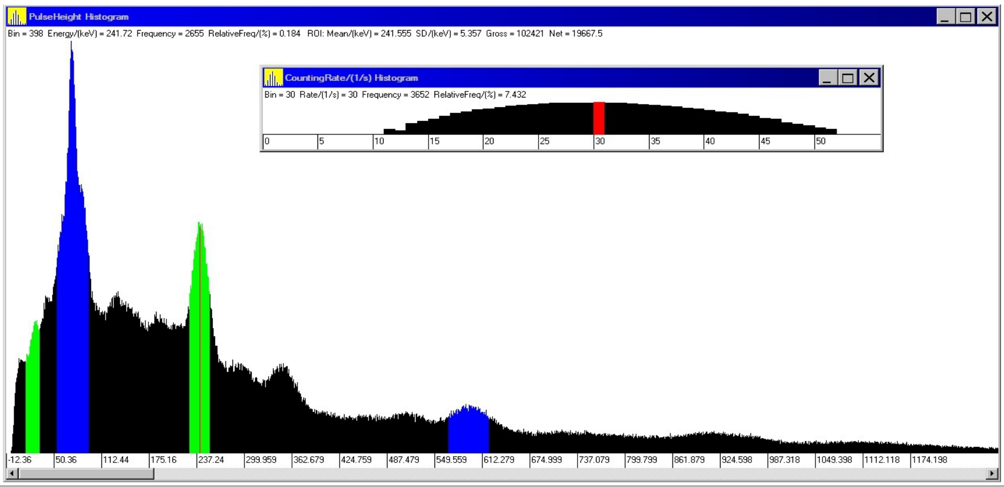


(Click image to see larger image in your web browser)

The peak on the far right on this chart at 1460 keV is radioactive Potassium, which is in Potassium Chloride. It is referred to as k40. This peak is caused by the radioactive K40 in the environment I did the testing in. A small amount of K40 is in Potassium Chloride, is in every living thing.

If you look at the red highlighted peaks in this chart, the peaks indicate the presence of radioactive Radium Ra-226, Lead Pb-214 and Bismuth Bi-214. Dry Bentonite clay could be used as a good environmentally friendly peak position calibration tool for this equipment. With the main peaks being Radium Ra-226 at 186 Kev and Lead Pb-214 at 242, 295, 352 keV and Bismuth Bi-214 at 609 keV.

One kilogram of Zeolite was tested **in a lead and copper lined test chamber.** The Zeolite test also showed that it had radioactive Lead and Bismuth Isotopes in it as well. It was not as radioactive as the Bentonite clay.



This will highlight the peak in a colour, and the PRA software will calculate the **Gross** counts in the chart heading. Divide the **Gross** count by the length of time of the test in seconds, to get the CPS (counts per second).

Work out the number of counts your scintillator tube should have detected, in one second, if your scintillator was prefect. Now divide this number by 100. This number represents 1% of a perfect count.

Now divide this 1% number into the number of CPS your scintillator tube actually counted in you chart peak. This is the scintillator percentage efficiency of your scintillator tube.

Once you know the efficiency of your scintillator, you can work out Bqs. If your scintillator tube was 12% efficient, you divide this into 100 to get the multiplication factor for a perfect count.

Example: 100% /12% = 8.33
CPS of peak in chart x 8.33 = Bqs

You now need to take into account the weight or volume of the sample. Say the sample weight was 500 grams. 1Kg/0.5kg = 2

CPS of peak in chart x 8.33 x 2 = Bqs/Kg

TIP: To post your result or not to post, that is the question! If you do post results don't use product names, use general terms like.

I found rice with contamination. The product packaging dated day / month / year states it was imported or grown in this state, or country etc.

This needs others with this type of equipment to test this, and confirm the results.

Consider contacting the relevant manufacturer, or government agency. Yes, there are risks in doing this. You will need to make a judgement on the communities, and your family's best interest on how to act. No one can make that decision for you.

All soils have radioactive isotopes in them. This is what creates a lot of normal background radiation. These isotopes are created from Uranium and Thorium decay, which are present in soils.

Soils and clays will have some radioactivity in them. That is why background radiation levels in a brick and tile house, are greater than a wooden one. The second green marker in the Zeolite chart marks the largest peak for radioactive Lead Pb-214, and the second blue marker is Bismuth Bi-214.

People are taking Zeolite and Bentonite clay to remove radioactivity from their bodies, but the clays already have radioactive isotopes in them. OK, they only take a small amount at a time, so maybe it doesn't matter? The benefits may out weigh the risks?

There is a big difference between using these items for environmental clean up purposes, or as a mud pack, to ingesting them. After testing and getting these results, the big questions are.

Is it a risk, or an advantage, to take these substances internally?

Do they actually remove radioactive contamination from a person's body as claimed?

Are the radioactive isotopes in them being absorbed when they pass through the digestive system?

It is generally agreed that consuming radioactive, or stable lead, is not good!

A Gamma scintillator only detects radioactive isotopes that emit Gamma radiation. There may be stable lead, and other types of heavy metal contamination also present.

After testing, I personally would not ingest these substances, without a lot of further research showing that they are actually doing something positive.

Bentonite Clay and Zeolite need further testing by others with this sort of equipment, to verify this. **Note, samples mined from other locations may test differently.**

Peaks in these charts are relative to the quantity of the samples used, plus the length of time the testing took. You will need to get an understanding of this to fully interpret the testing results from this equipment.

For instance, the peaks in the chart from the sample of radium on the clock dial which weighed a fraction of a gram, were very large. The Bentonite clay and Zeolite samples were 625 grams and 1 Kg. These are much larger test samples of material. They were also tested over a longer period of time.

You need to take into account, time, distance and quantity, to make a proper assessment of the results. The radioactivity detected in the Bentonite clay and Zeolite samples were very much smaller than the radium clock dial!

For the latest international reports on food detections visit "The Food Lab", at http://sccc.org.au/archives/2861

Download a list of commonly observed isotopes or do an isotope search here, http://ie.lbl.gov/toi/radSearch.asp

Most likely to detect | May Detect | Daughter may indicate presence | Can't Detect

Isotope Name	Symbol	keV Gamma Peak	Notes
Americium *	^{241}Am	60, 26, + 14 X-ray	In smoke detectors, nuclear waste
Barium	^{133}Ba	30, 303, 356,	
Bismuth *	^{214}Bi	609, 1120, 1238, 1765, 2204	Usually detected with ^{214}Pb
Beryllium *	^{7}Be	477	
Cadmium	^{109}Cd	88	
Cesium *	^{134}Cs	605, 796	If found together, it is most likely from the Fukushima Nuclear Disaster
Cesium *	^{137}Cs	662 + 32 X-ray	
Chromium	^{51}Cr	320	
Cobalt	^{57}Co	122	
Cobalt	^{58}Co	810, 864, 1675 + 6.4, 6.3, 6.5, 7.1, X-rays	
Cobalt	^{60}Co	1330, 1173	
Gallium	^{67}Ga	93	
Indium	^{111}In	23, 245	
Indium	^{113}In	35, 392	
Iodine	^{123}I	159	Created by Nuclear accident
Iodine	^{125}I	35.5 + X-ray 27.5	Created by Nuclear accident
Iodine *	^{129}I	40	In rain washouts and soil
Iodine	^{131}I	364	Created by Nuclear accident
Iridium	^{192}Ir	316	
Iron	^{55}Fe	6	
Lead Pb-210 *	^{210}Pb	47, + X-ray 11, 12, 13,	Daughter of radon decay
Lead *	^{214}Pb	242, 295, 352 + 78 X-ray	In soil and Radon decay rain washout
Neptunium	^{239}Np	440, 490 ± 10	low intensity
Plutonium	^{239}Pu	http://nucleardata.nuclear.lu.se/toi/nuclide.asp?iZA=940239	Broad spectrum of Gamma energies, look up < tables
Plutonium	^{244}Pu		alpha emitter, decays to ^{241}Am
Potassium *	^{40}K	1460	Found in most living things
Protactinium	$^{234}Pa^{m}$	766, 1001	Uranium decay
Radium *	^{226}Ra	46, 186, 193	Often found in soil testing
Radon *	^{222}Rn	510	Undetectable by this equipment alpha emitter, but its Pb and Bi daughters are.
Selenium	^{75}Se	264	
Sodium	^{22}Na	1770	
Sodium	^{222}Na	1275	
Strontium	^{90}Sr		Undetectable by this equipment, If Cesium is present, it could be also.
Technetium	^{99}Tc	140	
Tellurium	^{123}Te	27	
Thorium	^{232}Th		Decay daughters found in soils, Lead-212, Thallium-208, and Actinium Ac-208
Thorium	^{234}Th	12, 63, 93,	Decay daughters found in soils,
Tritium	^{3}H		Undetectable beta emitter
Uranium *	$^{238,236,235,234}U$		*** Click to see test charts**

NOTES

(Always open to suggestions to improve this guide)

The Gamma scintillator detectors mentioned in this free guide, are much more sensitive than a Geiger counter at detecting Gamma radiation. They can't detect alpha radiation. Food testing alpha detectors are very expensive.

Useful isotope look up sites
http://periodictable.com and http://nucleardata.nuclear.lu.se/toi

Suggested web sites to visit

For the latest formation on the Fukushima Nuclear disaster, go to http://www.enenews.com http://fairewinds.com, http://fukushima-diary.com, http://www.enviroreporter.com/and http://nukeprofessional.blogspot.com.au/. To get a better understanding of the affects of radiation on the body view ***Dr Christopher Busby*** and ***Dr Helen Caldicott*** videos on Youtube.

Using Geiger Counters, and taking test samples

http://www.youtube.com/watch?v=EMGF-nnNdL8

http://www.anti-proton.com for great videos about radiation, plus using a scintillator or Geiger counter.

http://www.fairewinds.org/content/how-citizen-scientists-can-sample-radiation

Enthusiast Groups

http://tech.groups.yahoo.com/group/GeigerCounterEnthusiasts/

http://tech.groups.yahoo.com/group/GammaSpectrometry/

Information to get people up to speed on the seriousness of the Fukushima Nuclear Disaster.

Get the message out there how serious the Fukushima nuclear disaster is, quickly, and efficiently. You don't need to explain anything, just distribute the lifesaver.pdf (or podcasts below), hand it out, mailbox it, or email it. Put it everywhere, libraries, notice boards, web pages, forums, Facebook, and tweet! Think outside the box.

http://technologypals.com.au/wp-content/uploads/2012/03/lifesaver.pdf

Podcasts

Encourage friends and family listen to these podcasts on New Zealand Radio Station GreenPlanetFM. Interviews on a radio station carry more weight when trying to convince friends, and relatives of the seriousness of the Fukushima nuclear disaster. It has with my friends and family. So if you can use these as a educational resource, please do.

Survival

http://www.greenplanetfm.com/members/greenradio/blog/VIEW/00000001/00000261/Peter-Daley-Australian-Whistleblower-on-the-Fukushima-Radiation-Crises--Survival.html

Crisis

http://www.greenplanetfm.com/members/greenradio/blog/VIEW/00000001/00000193/Peter-Daley-on-the-Fukushima-Radiation-Cloud-over-Australia–NZ.html#00000193

Free Geiger Counter Use Guide

http://technologypals.com.au/wp-content/uploads/2012/03/Using-a-Geiger-Counter-to-test-food-for-Radioactive-Contamination.pdf

Free guide on how to set up a DIY food testing lab, for radioactive contamination.

http://sccc.org.au/wp-content/uploads/2012/06/How-to-set-up-a-home-or-community-food-testing-lab-for-radioactive-contamination.pdf

Free Book On Stress Management

In the present circumstances this free book may also be a great help to you. http://technologypals.com.au/free-books