

Who can benefit from a gamma sample changer?

The number of gamma spectroscopy samples showing up in count rooms seems to be growing geometrically. People doing gamma spectroscopy in bioassay, NAA, waste characterization, sediment analysis or environmental radiation monitoring with either germanium or sodium iodide detectors can often benefit from a gamma sample changer that automates routine counting procedures. Regulatory requirements and QA programs can easily add another 30-40% more count load. Homeland security events could potentially generate large number of priority screening samples for many labs. Historically most labs have responded to this increasing number of samples by adding more detectors -- which in turn required more shields, more MCAs and more floor space. Add to this the increased work required for routine calibration and QA and you just have more of everything. If things really get backed up you can always add a second shift with still more people to hire, train and pay.

When detectors were smaller and the count times longer, you could effectively arrange samples so that the shorter counts were done during the day with human intervention to change samples. The 8hr plus counts could be counted over night. This would keep total available detector time deployed relatively efficiently. Several factors including higher efficiency detectors, the ability for the MCA systems to preset on an MDA, and the emergence of screening samples have all conspired to generate shorter average count times. Unless you have at least some samples that you know will require an 8-12 hr count time, keeping the detectors busy overnight with a single shift operation becomes problematic.

The cost effective solution to this problem may be to use an automatic gamma sample changer. Fortunately the computer power in commercially available MCA systems is well suited to this task. The objective is to leverage the existing detector and MCA system investment by making overnight and weekend hours productive counting hours. There is substantial experience where laboratories using automatic gamma sample changers have been able to increase the production of a specific detector by as much as a factor of 2-3 relative to their historic average on a manual system. This is based on 2-4hr count times with a 35-40% detector and a single shift, 5 day-per-week staffing level.

The benefit to your laboratory will depend on your specific samples, equipment, and operating methods. The purpose here is to raise questions that will help you define those factors in your count room's operation that effect the benefit you can derive from a gamma sample changer. You will have to think through the details of how you want to operate to determine the implications and benefits for your lab.

General rules for benefiting from a gamma sample changer

- Sample sets with short (~1/2hr) count times benefit a lot during the daytime hours from a sample changer simply because the operator is freed up to do other things without frequent interruptions.
- Regardless of the count times much of your benefit comes from the overnight and week end hours. This means that you must be able to handle enough samples in a single load to run at least overnight and, preferably, over the week end.
- Make sure that the sample changer is capable of handling several different counting protocols in a single load so you can have mix sample types.
- The closer and more flexible the integration with your MCA and analysis software of choice the better.
- Can the machine work with existing MCA systems and detectors? Will a special detector requirement cost me dearly in the future?
- Samples near or over 24hr count times have minimal benefit. You probably should just buy more detectors.

Questions for internal review:

Lab Staffing _____ Hr/day _____ Days/week

Number of samples _____ Heavy week _____ light week

Will turn around commitments allow averaging busy and light weeks _____ Y/N

Sample count times

Most common _____ Average _____

<1hr _____ #/ wk - must be day counts, lots of staff interaction

2-4hr _____ #/ wk - must be day counts, lots of staff interaction

2-4hr _____ #/ wk - these can help soak up overnight hours , minimal help over week ends

4-8hr _____ #/wk - efficient overnight – not much help over week ends

>24hr _____ #/wk - sample changer not of much help

Average hours/week the detector is currently actively counting _____
(potential hours =168hr from 24hr x 7days)

current backlog _____ # samples _____ total hours of count time _____ revenue \$\$

Will improved turn around generate more revenue and/or good will?



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