COST-EFFECTIVE EQUIPMENT QUALIFICATION

Reducing the qualification burden through some practical considerations and a pragmatic, and controlled approach

Equipment qualification has become a significant cost factor in the purchase, installation and start-up of equipment in both the Pharmaceutical and Medical Device Industries. For some manufacturers, equipment qualification now represents nearly 40% of capital acquisition costs. On a purchase of $ 2MM, the cost of qualification can approach $ 1MM. This is a significant financial burden to carry on top of the traditional amortization costs of the equipment.

In addition to these tangible costs, there are other, less concrete, costs associated with equipment qualification. The time spent qualifying the equipment adds to the actual expenditures by postponing the start-up of the equipment as well as delaying the moment when the cost savings begin. The lack of properly developed Standard Operating Procedure (SOP) is another factor that can delay the start-up of the equipment thereby generating additional soft costs.

When purchasing equipment, the Pharmaceutical or Medical Device manufacturer's goal is to begin production as soon as possible. An important factor in achieving this is to understand the difference between what must be done under the current regulations and what one may interpret the legislation to mean. It has been our experience that different Compliance Officers have different interpretations of the requirements.

On the one hand, some oversimplify the regulatory requirements. This carries a certain amount of risk as to the validity of the qualification exercise. The need to ensure a prompt start-up of new equipment must be tempered with the fact that the regulations have actually been enacted for, "the promotion and the protection of the public health".

On the other hand many compliance professionals view the regulatory requirements as a challenge to be improved upon. This often leads to the integration of additional tests as part of the qualification protocols. Many reasons have been proposed to justify this kind of behaviour. Some Pharmaceutical or Medical Device Manufacturers have a definite strategy to "raise the compliance bar" thus potentially driving out of business these competitors that may not possess the resources to keep the pace. Another reason is that some Compliance professionals may lack training in the interpretation of the legislation, or they may be influenced by certain Commercial Validation Providers

that seek an opportunity to enlarge their market. Finally, there always exists the possibility that someone may be attempting to justify his position within the organization.

We believe that there is a minimum level of compliance required and that the most cost effective way to achieve qualified status is by understanding where that minimum lies. The use of the word “minimum” should not be confused with “sloppy” or with what one “can get away with”. Moreover, minimum is not a synonym of “easy to achieve”.

Equipment qualification is often viewed as a necessary but sometimes a lengthy, costly and complicated exercise. In many organizations the Project Engineer or Project Manager’s responsibility is thought to end with the installation of the equipment. Equipment qualification is then turned over to a Validation or a QC/QA group. Responsibility for validation costs then becomes less well defined and, consequently, less controlled.

The successful Project Engineer or Project Manager will recognize that his project is not only to manage the equipment selection, construction, delivery and installation process, but also to manage and control the qualification process until the equipment is released to begin production of commercially saleable products. The development and execution of qualification protocols may be reviewed or supervised by a Validation or QC/QA. But the cost effective approach would be for the validation costs to be absorbed as part of the project budget. As a result there will be an increased focus on validation costs and a challenge to control the seemingly never-ending qualification.

The challenge then becomes one of reaching a certain balance in the efforts extended to meet the regulations. How is this achieved? We believe that the Pharmaceutical or Medical Device Manufacturers, the equipment manufacturers, and the Validation Providers each have a role to play in ensuring prompt and appropriate qualification of new production equipment.

THE ROLE OF THE PHARMACEUTICAL OR MEDICAL DEVICE MANUFACTURER

A well-thought and well-planned equipment qualification exercise will allow the Pharmaceutical or Medical Device Manufacturer to begin production promptly, thus reaping the benefits of new/incremental sales, as well as yielding the financial savings and the manpower reduction/re-deployment often associated with the purchase of new equipment.

Many people often make reference to a “*Validation Master Plan*” to ensure compliance with the regulations. The key word in this expression is the *Plan*. The *Plan* must include an examination of the requirements that are laid down as part of the regulations. Our approach is to identify what is the appropriate minimum that must be met under the regulations and to draft fitting FAT and IQ/OQ/PQ protocols to achieve an adequate and recognized level of compliance. By no means do we advocate carrying out less than what the regulations require. On the contrary, we wish to identify what MUST be done and we aim to get it done in the most efficient fashion possible.

Part of the *Plan* must recognize that something will change in the future. One must understand that this will require some form of Change Control. Change Control involves the analysis of the proposed change to assess its impact on the validated status of the equipment. This often means a partial or complete review of existing validation documentation for this equipment. If during the initial *Plan*, no thought has been put in to deal with this and literally "reams and reams" of paper have been created during the original qualification of the equipment, there is now a significant quantity of documents to review. On the other hand, if the initial qualification clearly defined the minimum scope required to achieve proper qualification of the equipment, then the amount of documentation to be reviewed will be more manageable.

Prior to initiating an exhaustive process validation and equipment qualification plan, the Pharmaceutical or Medical Device Manufacturer should seriously examine the need to carry out any testing and documentation while keeping in mind that he is operating within a business framework. From there, a well defined and limited *Plan* can be established and executed.

THE ROLE OF THE EQUIPMENT MANUFACTURER

How can the Equipment Designer and Builder help in qualifying equipment? The first and most obvious answer is experience. Experience in the design and construction of equipment. From this knowledge, one can better determine the limits of the equipment capacities and suggest ways to test the equipment to verify those capacities.

Another important factor for the equipment designer is to recognize that their true expertise lies with the design and assembly of equipment. Although some manufacturers can supply some form of documentation, their core business and focus is machinery, not equipment qualification regulations. The documentation that they produce will be extremely valuable as support documentation for the equipment qualification, and for its operation in production.

The equipment manufacturer should also be aware that there is a potential perception that he may "go easy" on his equipment if he supplies the qualification protocols. The use of an outside validation provider will yield additional credibility as he will want to serve the best interests of both the Pharmaceutical or Medical Device manufacturer and the equipment designer and builder.

THE ROLE OF THE VALIDATION PROVIDER

How will the Validation Provider contribute to the qualification process? In this case, the first obvious answer is knowledge; knowledge of the regulations and knowledge of equipment. The second important answer is an understanding of the significant cost burden that the qualification process can add to a project. The ideal mix of experience is one derived from within the industry as Pharmaceutical or Medical Device manufacturers and from the equipment designer and fabricator. The experience within the Pharmaceutical or Medical Device industry will give the Validation Provider an

intimate understanding of the regulations while his experience as a machine designer gives him a keen understanding of how machinery is intended to operate.

Having experience with both sides, the validation provider can bridge the knowledge gap between the Pharmaceutical or Medical Device manufacturer and the equipment designer and supplier. The Validation Provider can ensure that the regulatory needs of the PMDB manufacturer are understood by the equipment supplier. He can manage those needs for the equipment supplier and ensure that the documentation required is produced with a minimum of interference to the machine design and construction. The Validation Provider can also assist in the management of the qualification cost by acting as a concerned third-party.

The Validation Provider is acts as an additional source of information on the interpretation of the regulations. He will keep up with the current regulatory requirements in the industry by the simple nature of his business. He will sell his services to as many Pharmaceutical or Medical Device Manufacturers as he can. However, in the course of carrying out business, the Validation Provider will be automatically exposed to many different viewpoints on the regulations and the trends within the industry.

In summary, the Validation Provider can assist in defining the requirements and prepare the *Plan* with the Pharmaceutical or Medical Device manufacturer. He can then work with the equipment supplier to ensure that those requirements are properly understood and well managed so that all required documentation is delivered in the shortest time possible. Finally he can close the loop by executing the qualification protocols after installation and provide the Pharmaceutical or Medical Device manufacturer with a complete executed validation package that will allow the equipment to begin operation in the shortest time.

OTHER CONSIDERATIONS

What other steps can the Pharmaceutical or Medical Device Manufacturer take to control the time and cost of equipment qualification?

- Investigate the possibility of carrying out part of the qualification process at the equipment manufacturer's site. This will yield the following benefits;

  First, it allows the Pharmaceutical or Medical Device Manufacturer to deal with any discrepancy in the protocols with the support of the equipment designer. When attempting to determine a plausible and probable cause for a deviation to a protocol step, the equipment designer, because of his intimate knowledge of the intent of the design and the design itself, can assist in focusing the search for the cause and the search for a solution.

  Second, when the qualification is carried out at the supplier's site, offer that his technical and operational personnel participate in the process. This will allow them to get familiar with the equipment without feeling the pressure that the

equipment is in place and not yet running because the qualification is not completed. It has been our experience that the time spent at the supplier's site to perform part of the qualification is more than made up when the equipment is delivered to its final location as the learning curve has already been flattened.

Finally, when the equipment is delivered and installed, the business of manufacturing a product for commercial sale will be attained in a minimum time.

- Ask the equipment supplier if he can assist with the training of your personnel. Some equipment manufacturers offer operators training as well as maintenance personnel training. This can be incorporated in the training file of the employees and serve as their qualification to work on the equipment. Again, this reduces the time that the equipment is idle after installation before "actual" production can commence.

From the equipment supplier's standpoint, what are the steps that can be taken to ensure that the equipment will operate properly and the qualification process will be well managed?

- Ask if part of the qualification can be carried out at the factory? This will yield similar benefits as noted above. In the event that the equipment does not perform exactly as designed, it will be easier and faster to look for answers when everybody involved in the design and construction of the equipment is available as well as all other resources from the factory.

- Ask if the qualification protocols can be fully executed at the factory as a "dry run". This will ensure that all aspects of the testing will be verified prior to actual execution at the Pharmaceutical or Medical Device manufacturer's facility. This will, in turn, increase the feasibility of a successful shorter qualification.

SUMMARY

Equipment qualification is not an option within the Pharmaceutical and Medical Device Industry. The challenge is to reach a "qualified" stage in the most efficient manner, reaping the benefits of additional production capacity as well as increased revenues.

Documentation is not an option either within this industry. A balance must be reached between too little and too much documentation.

We believe that the key to these challenges is the understanding that "Validation is a legal requirement within a business environment; not a science in itself".

In plain language, 40% of a capital acquisition budget is an extremely large amount of money to be left virtually un-managed. There are opportunities to achieve both successful qualification and cost control. One simply has to have a clear *Plan*.