www.microbiologyforum.org

PMF NEWSLETTER

A PUBLICATION OF THE PHARMACEUTICAL MICROBIOLOGY FORUM
Distributed Internationally to 7812 Subscribers in 87 Countries

Volume 12, Number 11 November, 2006

Cleanrooms and MDD (OOS)

The Fall Forum was a great success! Thank you to all the presenters, participants and exhibitors who made this year's conference an interesting and exciting opportunity to discuss some of the recent developments in microbiology.

This month's newsletter features a discussion of cleanrooms by Anne Marie Dixon who has worked in this field for many years. She provides a practical, workable approach to cleanroom management and maintenance that will be an asset not only to the aseptic manufacturer, but also to anyone who has responsibility for the maintenance of controlled environments.

Important Links:

Information on the PMFList at
http://www.microbiol.org/pmflist.htm

Past Issues of the *PMF Newsletter* at
http://www.microbiologyforum.org/news.htm

A second article in this month's edition presents a new acronym to the readers. Out of specification (OOS) results have generated a lot of regulatory attention, but unfortunately the majority of the regulatory guidances have focused on analytical chemistry assays to the detriment of the microbiological discussion. PDA has had a task force involved in the microbiology side which coined the acronym MDD (Microbiology Data Deviations) to distinguish the two. I completely support this distinction, and present one approach to investigations of MDD in this issue.

Finally, there is a real need for better communication between industry and the compendia. Despite a three-year advance notice, many in industry have expressed surprise over the implementation of the harmonized microbial limits tests. PMF will be hosting an Open Conference in February of 2007 to encourage discussion between the compendial representatives and industry. We all are responsible for making the compendia reflective of best practices and it is hoped that providing opportunities for free and open discussion will lead to better regulations, and to enhanced knowledge of upcoming regulatory issues.

Scott Sutton, Ph.D. scott.sutton@microbiol.org

Cleanrooms and Controlled Environments
Maintaining the Level for Which They are Designed

Anne Marie Dixon
Cleanroom Management Associates, Inc.
Carson City, NV

Introduction

Cleaning and Sanitization is not an absolute science. It is relative to the degree to which a contaminant can be isolated from or eliminated. The level of cleanliness required by a cleanroom or controlled environment is therefore based on the following factors:

- Product manufactured
- Process
- Regulatory requirements
- Class and type of cleanroom or controlled environment
- Quality requirements

Equipment and Supplies

Once the requirements have been established, the equipment, supplies, and techniques are the key elements to this process. Of course the supplies must be suitable for the cleaning agent or disinfectant application and must be adequately cleaned, sanitized or sterilized prior to use. The basic supplies are:

Vacuums – central plant system, wet or dry with attachments or portable unit with HEPA or ULPA filtered exhaust

Mops and buckets – head constructed or non-shedding materials compatible with the cleaning agent and surfaces to be cleaned/sanitized

Water – this is always equal to the product quality

Wipes – non shedding or low shedding absorbent materials compatible with the cleaning agent and surfaces to be cleaned/sanitized.

Cleaning agents – aqueous detergents, disinfectants. The need for safe and effective disinfectants is of great importance to the Healthcare industry. These chemicals are required for the reduction of microbiological populations on cleanroom surfaces and equipment. The selection criteria and rotation will be based on validation studies performed at each facility. The most common disinfectants and sanitizers can be categorized as:

- Phenolics
- Alcohols
- Quaternary Ammonia
- Chlorine
- Hydrogen Peroxide

Methods

The techniques for cleaning and disinfectant application are defined in the IEST (Institute of Environmental Sciences and Technology) document RP-18.3 "Cleanroom Housekeeping – Operating and Monitoring Procedures. This document is the basis for the ISO 14644-5 – Cleanrooms and Controlled Environments: Part 5 – Operations sections on cleaning. The techniques for wall mopping are vertical or horizontal overlapping strokes – with restrictions on length per mop stroke. The floors are mopped using either the overlapping "pull-lift" method or modified figure "8." Again, there are restrictions on length per mop stroke. The IEST committee has validated all of these methods with published testing by Research Triangle Institute (microbial efficiency challenge) and University of Arizona (particulate efficiency challenge) and 6-12 months of round robin testing.

Workstations are wiped in one direction only, using overlapping strokes. The wipe is moistened directly with the cleaning agent. Equipment, furniture and fixtures should be wiped in one direction only generally top to bottom, using overlapping strokes.

The sequence of cleaning in a vertical cleanroom is from top-

(Continued on page 3)

(Continued from page 2)

to-bottom - ceiling, walls (include window and door), equipment, and finally the floor. The rooms are cleaned from the most critical to the least critical, generally ending in the pre-gownroom.

Testing

The methods for testing surfaces are classified according to the size and type of particle. These are numerous non-viable methods that can be used to assist the user in determining the frequency and efficiency of their program. Visual inspections will depend on the physical characteristics of the particle, contrast of the background, wavelength and intensity of the light sources and the experience of the personnel. For cleanrooms and controlled environments, there are several types of visual inspections that can be used. Visual inspections, using unaided light can be performed at any time throughout the day. It will require the ability of the operational or quality personnel to observe, under routine operational conditions that surfaces and equipment for any evidence of contamination that is visible to the human eye.

A wipe test requires the placement of a moistened wipe onto a surface. The wipe is examined for residue and particles. This method is limited to the ability of the wetting agent to remove a residue or particle.

The common light inspections are performed using ultraviolet light (365nm) or high intensity oblique white light. The sensitivity of the process and product will dictate that type of light that can be used for this inspection. The UV light causes certain materials to fluoresce; however, not all fluorescent material is a contaminant, nor does all contamination fluoresce. The high intensity technique uses a reflective light and the contrast of color and shadow effects caused by particles on smooth surfaces.

The two test methods for assessing microbial populations on surfaces are contact plate and swab. Contact plates are generally used on flat surfaces, and swabs are used for irregular surfaces. No biological recovery method is absolute. The user must be aware of the limitations of these methods – growth media, surface condition, incubation, sampling techniques, etc.

The acceptance criteria for viable and non-viable testing should be established for all surfaces and areas of the cleanroom and controlled environments. The frequency of cleaning and sanitization can be determined by the acceptance criteria established and the results of the testing. Cleaning and sanitization schedules must also consider any changes in equipment and population density of the facility.

Training

With any cleanroom or controlled environment function, training is key. Standard Operating Procedures must be written for each facility. These must include the materials, techniques, and frequency of cleaning and sanitization. However, learning to clean and sanitize a cleanroom or controlled environment is not done by simply reading an SOP. This activity requires practicing the techniques and understanding the sequence of events. Prior to performing any cleaning, the employee must be trained in gowning and cleanroom operations. Of course the operations must include safety requirements of any cleaning agents that are selected.

Summary

Cleanrooms do not operate by themselves. They must be maintained and supported. These activities require careful consideration to the design of the facility, tools, techniques, testing and training of the personnel. Continuous testing and auditing must be performed with investigations of any deviations to ensure that the facility is maintained at the level for which it was designed.

Internet Address	Description
http://www.bacterio.cict.fr/	List of Prokaryotic Names with Standing in Nomenclature (Formerly List of Bacterial Names with Standing in Nomenclature (LBSN))
http://www.recalls.org/	A Non-profit organization's web site listing recalls. In particular they list recalls for drugs, medical devices and cosmetics.
If you have found an Internet site that contains information of relevance to professional microbiology in the industrial sector, please let us know.	

Conducting Microbial Data Deviations (MDD) Investigations

Scott Sutton, Ph.D.
Vectech Pharmaceutical Consultants

One of the more entertaining events that happens in QC Microbiology is when a critical test comes back with an unfortunate answer. Depending on the nature of the test and the product being tested, this could be good for as much as two months of "special" meetings and management-assisted introspection. However, a solid plan in place to deal with these events can go a long way to smoothing the investigation and increasing its effectiveness.

Now might be a good time to discuss the general methods that might be employed in the investigation of a Microbiological Data Deviation. There are several recent guidance documents that might have a bearing on this discussion. FDA recently released (October, 2006) the revised guidance document on investigation of Out-of-Specification Test Results (1) which discusses chemical analysis, specifically excluding microbiological and other biological assays (see footnote 3 of this guidance document, confirmed by personal communication).

It is of interest to note in this document, however, that OOS is defined to include "all test results that fall outside the specifications or acceptance criteria established in drug applications, drug master files (DMFs), official compendia, or by the manufacturer. The term also applies to all in-process laboratory tests that are outside of established specifications." This definition places the FDA in conflict with the ICH Q7A (GMP for APIs) guidance which states "Out-of-specification (OOS) investigations are not normally needed for in-process tests that are performed for the purpose of monitoring and/or adjusting the process."(2) Leaving this disagreement aside for the moment, let's take a look at compendial direction.

The recently released USP chapter <1117> (3) includes a section entitled "Interpretation of Assay Results" and lists the difficulties associated with resolving MDD:

- Microorganisms are ubiquitous and common contaminants
- Analyst contamination of the test is possible
- Microorganisms may not be homogeneously distributed in a sample
- Microbiological assays are subject to significant inherent variability.

These difficulties are one reason that the supervisor of the lab should be one with academic training in microbiology or bacteriology. Microbiological data requires interpretation, it is not data that can be presented solely by test results. Investigations should be conducted from a broad perspective, not only looking at equipment, training, product and test, but also the underlying biology associated with the situation.

I will try to lay out one general approach to MDD investigation in this essay. Investigations into specific tests will require some modification of this general approach. These modifications will vary based on the peculiarities of the assay and recovery method, but will usually only add to the investigation—this template should be viewed as the minimal acceptable. Also, I make little effort in this discussion to address documentation issues - the document control police at different companies follow practices that are useful in their company, but are not standardized. This is not to minimize the importance of document control, but any statements beyond generalities will get me in trouble at *some* company and so take this discussion as general guidance with the caveat that you must follow local rules on specific GMP matters. I

(Continued on page 5)

(Continued from page 4)

also have to note (in the interest of fairness) that this is only one approach to MDD investigations. There is no consensus approach today.

General Process for Investigating Microbial Data Deviations in the Laboratory

Prior to initiation of a formal investigation it is prudent to check common data entry errors:

- Incorrect math
- Sample dilution series error
- Transcription error
- Clerical error
- Nonsensical microbial identification

This practice of conducting a preliminary laboratory evaluation should be covered by SOP and documented. It is the responsibility of the Subject Matter Expert (SME) (in this case the academically trained microbiology lab supervisor) to resolve the issue and determine if an MDD did in fact occur.

Should these common, correctable errors not be the cause of the potential MDD, then management should be notified immediately and a formal MDD investigation initiated. The overall investigation will be coordinated though the Quality Assurance Unit (QAU). The laboratory investigation should be accompanied by a review of the manufacturing record for that batch (or batches, if the deviation is in a study of environmental monitoring, water, steam or other manufacturing system), but this is not the topic of this discussion. A proposed flowchart for a general lab investigation is presented on the next page.

As the formal investigation will be coordinated through the Quality Assurance Unit, the microbiology laboratory will be in a support role. In that role, the microbiology unit retains its responsibility as the (SME) in microbiology and in the particular tests. If the data deviation was determined to be due to error in lab practice, then the test may potentially be declared invalid. An invalid test is, by its nature, not a valid test. Therefore, the subsequent test is not a retest but rather the first correct performance of the assay. This distinction is important as some assays may be, in fact, investigated by confirmatory testing due to the inherent variability of the assays and the distinction between the two conditions must be kept clear in the investigation documentation.

Much of the investigation will require evaluation of data records and test samples. Physical constraints on space may prevent retention of all samples and test articles that might be of interest. However, it is prudent to retain as many of the critical samples as possible until the successful completion of the test to aid in the laboratory investigation of a potential issue.

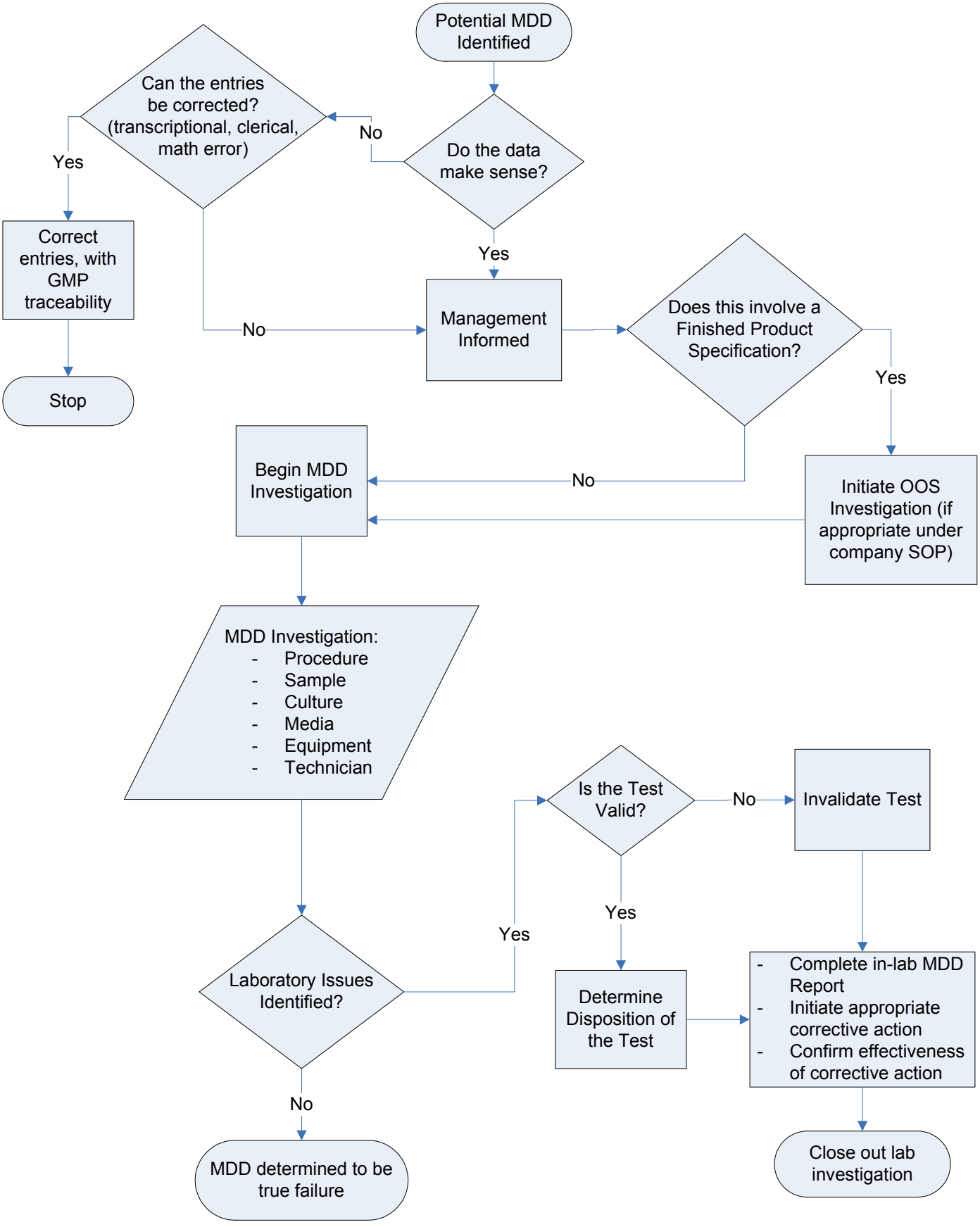
Does the MDD Involve Finished Product Specification?

If the test under investigation is one of a finished product specification, the QA unit needs to determine if the MDD is to be tracked and reconciled under the company's OOS procedures. If specific categories of MDD are to be tracked under the company's OSS/CAPA procedures, then specific allowance should be made to distinguish microbiology and chemistry tests in these investigations. If this is not a finished product specification (*e.g.* raw material acceptance, in-process test, method suitability study, biological indicator study, environmental monitoring, *etc*) then the company might have a procedure in place to deal with MDD that do not fall under the OOS constraints. This does not relieve the company of the need for appropriate corrective actions, or demonstration that the corrective actions undertaken were effective. However, many MDD have no discernable impact on product quality and a strong case can be made that they should be handled under separate procedures from OOS.

Procedural Issues

A common cause of data deviations is the use of the incorrect procedure for testing. This can be as blatant as testing for the wrong characteristic (e.g. testing for antimicrobial efficacy rather than for bioburden) or somewhat more subtle (use of a retired revision of the correct SOP). It is also important to confirm that the relevant method suitability studies have been performed, and that all plate counts are within the countable range for that organism and recovery method. Finally, were all test controls completed successfully? More detail on this topic can be found in the USP chapter "<1117> Microbiology Best

(Continued on page 7)


Potential MDD Identified
Do the data make sense?
No
Can the entries be corrected? (transcriptional, clerical, math error)
Yes
Correct entries, with GMP traceability
Stop
No
Yes
Management Informed
Does this involve a Finished Product Specification?
Yes
Initiate OOS Investigation (if appropriate under company SOP)
No
Begin MDD Investigation
MDD Investigation:
- Procedure
- Sample
- Culture
- Media
- Equipment
- Technician
Is the Test Valid?
No
Invalidate Test
Yes
Laboratory Issues Identified?
Yes
Determine Disposition of the Test
- Complete in-lab MDD Report
- Initiate appropriate corrective action
- Confirm effectiveness of corrective action
No
MDD determined to be true failure
Close out lab investigation

(Continued from page 5)
Laboratory Practices."

Sample Issues

Was the correct lot of product tested? Was there any obvious damage to the containers, and did the product have the expected physical appearance? In addition, the investigation should check to ensure that the correct number of containers were delivered to the lab and were used in the assay. Manufacturing records can be useful here to confirm correct manufacture of the product, and chemical analysis should confirm correct formulation. Finally, the method of sampling can contribute to a putative failure. Different manufacturing functions have different requirements for sampling – ensure that the microbiology samples were taken aseptically and transported to the lab in a manner that protected the microbiological quality of the sample.

Microbial Culture Issues

For assays that utilize microbial cultures (antibiotic potency, antimicrobial efficacy, *etc*) the identity and lineage of the cultures used must be confirmed. Laboratory records should allow an investigation to trace the microorganism used from the test all the way back to receipt from the national culture collection. The number and the conditions of each passage should be available for review, as should the confirmation of identity upon receipt of the culture into the lab. The identity of the culture in the test under review should be confirmed as equivalent to the challenge organism (usually through genotypic means sensitive to the strain level). As most laboratories utilize a seed lot culture technique for maintenance of cultures, the working slant used in the test should be routinely retained for analysis in case of an investigation, or subjected to QC checks on the day of use. Finally, other tests that utilized the inoculum from this working slant, and from the parent frozen culture, should be reviewed to confirm the performance of the culture under a variety of conditions.

Media Issues

Media is one of the most critical aspects of most microbiological tests. The laboratory should confirm that the media used in the assay was the correct formulation for that test. In addition, all media used passed the physical QC checks (pH, appearance, integrity of container, etc) as well as relevant growth promotion and sterility checks. The expiry and storage conditions of the media should be confirmed. Finally, a review of all other tests using this media batch should be conducted to confirm adequate performance of the media in a variety of situations.

Equipment Issues

This concern is common to all investigations. Questions to be evaluated include: Were the correct instruments used? Were the incubation temperatures correct and within specifications? Was the equipment calibrated? Was it on a regular calibration and preventative maintenance schedule? Were the incubators used in this test cleaned regularly? Were other tests incubated with the test under investigation properly concluded without incident?

Personnel Issues

Microbiology is an extremely operator-dependent discipline. Training and expertise of the bench technician is critical. The technician should be currently trained in the correct revision of the SOP. Ideally, the lab should have a method for proficiency testing in place for each technician. If this is not available, the investigator should compare past performance by the technician of the test against performance of the test by all others in the lab. Any technician-dependent deviations should be addressed immediately.

General Process for Closing Microbial Data Deviations in the Laboratory

The investigator should determine if the MDD was the result of:

- Laboratory error (invalid test)
- Assay variation
- Failing product
- Inconclusive causes

If the test is invalid, a valid test should be run immediately to determine compliance. In addition, a corrective action plan should be put into place in the laboratory to remedy the error and prevent its recurrence. This plan should include a measure of the efficacy of the corrective action.

(Continued on page 8)

(Continued from page 7)

If the MDD was due to assay variation, a determination should be made as to the appropriateness of confirmatory testing. This determination should be guided by SOP as assay variability is a known quantity in microbiological testing and procedures should be in place to resolve indeterminate results.

If the MDD was the result of failing product, the product should be handled as appropriate under management guidance.

If the MDD investigation is inconclusive, the investigation should be retained on record and considered in the batch or lot disposition decision.

General Comments on Documentation Practices

The potential need for information to conduct the investigation is a critical GMP concern. The regulators have been arguing the need for proactive documentation for years, but as a consultant I continue to see laboratories that do not maintain records adequate to allow a successful investigation. This is one of the most basic requirements in running a successful QC laboratory and should not be overlooked. One potential use of an investigation can also be to identify gaps in the laboratory's documentation practices and use the opportunity to correct those failures.

To rephrase this last point - the investigation into a MDD can serve many purposes, not least of which is to serve as a "trial by fire" on the adequacy of the laboratory's notebook write-ups practices (this does not address the format - either bound notebook or lab worksheet style is acceptable so long as GMP issues are satisfied) . If there is insufficient information in the laboratory write-up to allow for an adequate investigation, one of the first CAPA activities should be to amend lab documentation practices to record sufficient information in a proactive manner.

References

1. http://www.fda.gov/cder/guidance/3634fnl.htm
2. http://www.fda.gov/Cber/gdlns/ichactive.pdf
3. USP, "<1117> Best Microbiological Practice" USP 29 Supplement 2, 2006

PMF Open Conference on Compendial Issues

The open conference format is designed to allow maximum interaction between the presenters and the participants. This has been used very successfully in the past to solicit information on new compendial chapters, and to lay the groundwork for future developments in the pharmaceutical, medical device, and personal products industries. As the recent concerns over the Harmonized Microbial Limits Tests demonstrate, there is a need for better communication and awareness on the part both of the compendia and industry.

There has not been a conference of this type offered since 2002, and this will be the only one offered in 2007. The PMF has invited participation from international compendial experts, and this conference promises to be extremely well-attended. The tentative schedule is provided below.

The first day will be an introduction to the relevant issues by international experts. The day will be led off by a keynote address, delivered by Jim Akers, Ph.D., the chairman of the USP microbiology committee of experts. This will be followed by perspectives on the main topics of the conference and finally by regulatory perspectives.

The second day will be devoted to discussion. Each participant will be assigned different discussion groups throughout the day to address issues surrounding the main conference topics, or to air issues of relevance to their experience. The discussions will be facilitated by members of compendial committees in microbiology or regulatory agencies, and offer the participants a chance to bring questions directly to the people responsible. In addition, the participants can use this opportunity to benchmark their practices against the industry norms.

The third day will be a summation of the discussions presented by the discussion group facilitators and the regulatory representatives. Every attempt will be made to have the slides from this session available prior to the participants departure, but if this is not possible, the presentations will be emailed to all in attendance.

Finally, a transcript of the proceedings will be prepared by the moderators; Dr. David Porter and Dr Scott Sutton. The transcript will be emailed to all in attendance.

It is anticipated that the conference will fill up quickly, as this will be the best opportunity to discuss the new chapters available in 2007. A limit on the number of delegates is in place to maintain the effectiveness of the discussion groups. Early registration is recommended to secure your place in this pivotal conference.

Registration Information

Tentative Schedule for 2007 PMF Open Conference on Compendial Issues	
February 19th	
Morning Presentations	• Keynote Address by *Dr. James Akers*, Chair, USP Committee of Experts; Microbiology and Sterility Assurance • Aseptic Processing - USP <1211>, <1116> and the EU Annex 1 changes • The Harmonized Microbial Limits Chapters: Changes, Validation and Implementation • Validation of Alternate Microbiological Methods; USP, Pharm Eur Perspectives and the Role of PAT
Afternoon Presentations	• USP <1117> Best Laboratory Practices • cGMP Issues in the Microbiology Laboratory • Regulatory Agency Comments
Reception	
February 20th	5 discussion sections led by compendial and regulatory experts on topics introduced the previous day. Scribes will be in attendance to capture the discussion.
February 21st Morning Presentations	• Summary of Discussions on Aseptic Processing • Summary of Discussions on the Harmonized Microbial Limits Chapters • Summary of Discussions on Validation of Alternate Microbiological Methods • Summary of Discussions on USP <1117> Best Laboratory Practices • Summary of Discussions on cGMP Issues in the Microbiology Laboratory • Regulatory Agency Summations **Meeting Ends Before Lunch**

Upcoming Events

November

- November 29th - 30th **15th Annual PharMIG Meeting**
  Location: Nottingham Belfry Hotel
  Contact: Maxine Moorey (maxine@pharmig.org.uk)
- November 29th - 30th **Cleanroom Design, Construction, Validation, Maintenance, Monitoring** (Microrite)
  Location: Crowne Plaza, Burlingame
  Website: **Brochure**

January 2007

- 21st - 23rd **RMUG Conference**
  Location: Arlington, VA, USA
  WebSite: RMUG Registration Forms

February

- 19th - 21st **PMF Open Conference on Compendial Issues**
  Location: Baltimore, MD, USA
  WebSite: www.highpeaks.us

March

- 5th - 6th **PMF Conference on Water Systems Microbiology**
  Location: Philadelphia, PA, USA
  WebSite: www.highpeaks.us

April

- April 1st - 4th **Annual Conference of the Association for General and Applied Microbiology (VAAM 2007)**
  Location: Osnabrück, Germany
  WebSite: www.conventus.de/vaam2007
- 16th - 17th **PMF Bacterial Endotoxin Summit**
  Location: Puerto Rico
  WebSite: www.highpeaks.us

Offering In-House Courses on Microbiology/Aseptic Processing:

- The Microbiology Network/High Peaks Associates http://www.highpeaks.us/in-house.htm
- USP
  Contact Steven Paul (stp@usp.org) for information on the course "Fundamentals of Microbiological Testing"

USP Corner

Any questions concerning USP documents should be sent to Radhakrishna (Radha) Tirumalai, Ph.D. You can reach Dr. Tirumalai at: (706) 353-4514, via mail at United States Pharmacopeia, 126 Twinbrook Parkway, Rockville, MD 20852 or via e-mail at RST@USP.org. You can write representing your company, or as an individual scientist.

RMUG™ Meeting

The Rapid Micro Users Group ™ (**RMUG ™**) will host its 5th Annual Conference at the Hilton Crystal City in Arlington, VA January 21-23, 2007. "Crossing The Finish Line-Achieving Rapid Micro Approval" is this year's headline theme. The conference is a rewarding educational experience with new and comprehensive Technology Workshops, Exhibits and Seminars covering hot industry topics such as: Process Analytical Technology (PAT), Rapid Biological Indicators, Recovery of Organisms for Identification, New USP and EP Publications, Real-Time PCR and Real-Time Immuno-PCR. Every year RMUG ™ attracts about 120 attendees, including Laboratory Scientists, Microbiologists, QA and QC Managers, Biology and Scientific Regulatory Affairs Managers from both large and small corporations, as well as a strong FDA presence.

Early Bird Special Pricing Packages ends **Friday November 17th** . Your registration fees include a beautiful Monday night Gala dinner at the National Geographic Museum, Cocktail Reception, Two Day Conference, access to all Exhibits and Technology Workshops, Breakfast and Lunch during the conference and two or three night hotel accommodations.

If you would like more information or have any questions, please contact a RMUG ™ representative at (800)966-8832 or rmug@vectech.com.

Discussion List Update

PMFList:
Number of Subscribers: 1,843
Number of Countries: 63
Number of Messages Last Month: 260

PSDGList (Pharma Stability Discussion Group):
Number of Subscribers: 873
Number of Countries: 21

Membership is FREE. To **join the PMFList**, visit http://microbiol.org/pmflist.htm and register.

A sister Email is devoted to topics in the **stability testing** of pharmaceuticals, medical devices and personal products. To **join the PSDGList**, visit http://microbiol.org/psdglist.htm and register.

You can ask, answer, or read questions and comments from your colleagues. Archives of the lists are available at:

- http://lists.microbiol.org/archives/PMFLIST.html
- http://lists.microbiol.org/archives/PSDGLIST.html

The 2006 PMF Fall Forum

The 2006 PMF Fall Forum was a great time! This was the largest yet, with an attendance of 65. In all honesty, we may have to put a cap on the size of the meeting as the opportunity for interaction among the participants and the presenters is critical to the success of the meeting, and this may be lost if the meeting becomes too big. The session was marked by the earliest snowfall on record for the area (October 12) which hit Buffalo with two feet of snow just 50 miles to the west!

In addition to the presentations, the participants and presenters had an opportunity to meet with each other over meals and at a relaxed reception (featuring a local jazz guitarist). The exhibitors also contributed to the learning experience, bringing some real-world solutions to several of the problems under discussion.

This year, as in years past, the conference received both high marks from the participants and suggestions for improvements:

- "Some topics require more time. Perhaps next year 3 days? Overall it was a great conference & I would highly recommend to others"
- "Very pleased with overall topics—general yet specific enough."
- "Thank you! The meeting was wonderful!"
- "Outstanding & wonderful to be with and interact with other pharma microbiologists."
- "This was the first PMF conference for me. I found it to be very informative and hope to attend many more."
- "It would have been wonderful if it had a discussion forum also where a particular person from the audience would throw a question for discussion and everyone chip in. It would have made it possible for us to know what other companies are doing."
- "Excellent training!! I enjoyed the content and discussion of each presentation."

Topics Covered this Year

- Culture Collections and Cryopreservation - *Liz Kerrigan, ATCC*
- What Is Disinfectant Validation? - *Jose Martinez*
- The Harmonized Microbial Limits Tests - *Dr Scott Sutton, PMF, Vectech Pharmaceutical Consultants*
- Activities of the USP - *David Porter, Ph.D., Vectech Pharmaceutical Consultants (formerly Director, USP)*
- Strategies for Managing Environmental Monitoring Investigations - *Dilip Ashtekar, Amgen*
- Microbial Identification - *Michael Waddington, Accugenix*
- Benefits of a Polyphasic Approach to Microbial Identification - *Gary Jackoway, MIDI, Inc.*
- Disinfectants and Cleaning - *Art Vellutato, Jr, Veltek*
- FDA Review of Manufacturing and Microbiological Process Control - *Dr. David Hussong, Chief Review Microbiologist, CDER*
- Discussion of Part 9000, Microbiology, in Standard Methods for the Examination of Water and Wastewater - *Margo Hunt, EPA*
- Environmental Monitoring for Non-sterile Production - *Jeff One, Abbott Laboratories*
- Aseptic Process Simulations - *Roxanne Robles-Torres, Wyeth Laboratories*

Speakers are pictured below (Ms. Kerrigan not pictured)