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Where Science and Management Meet™

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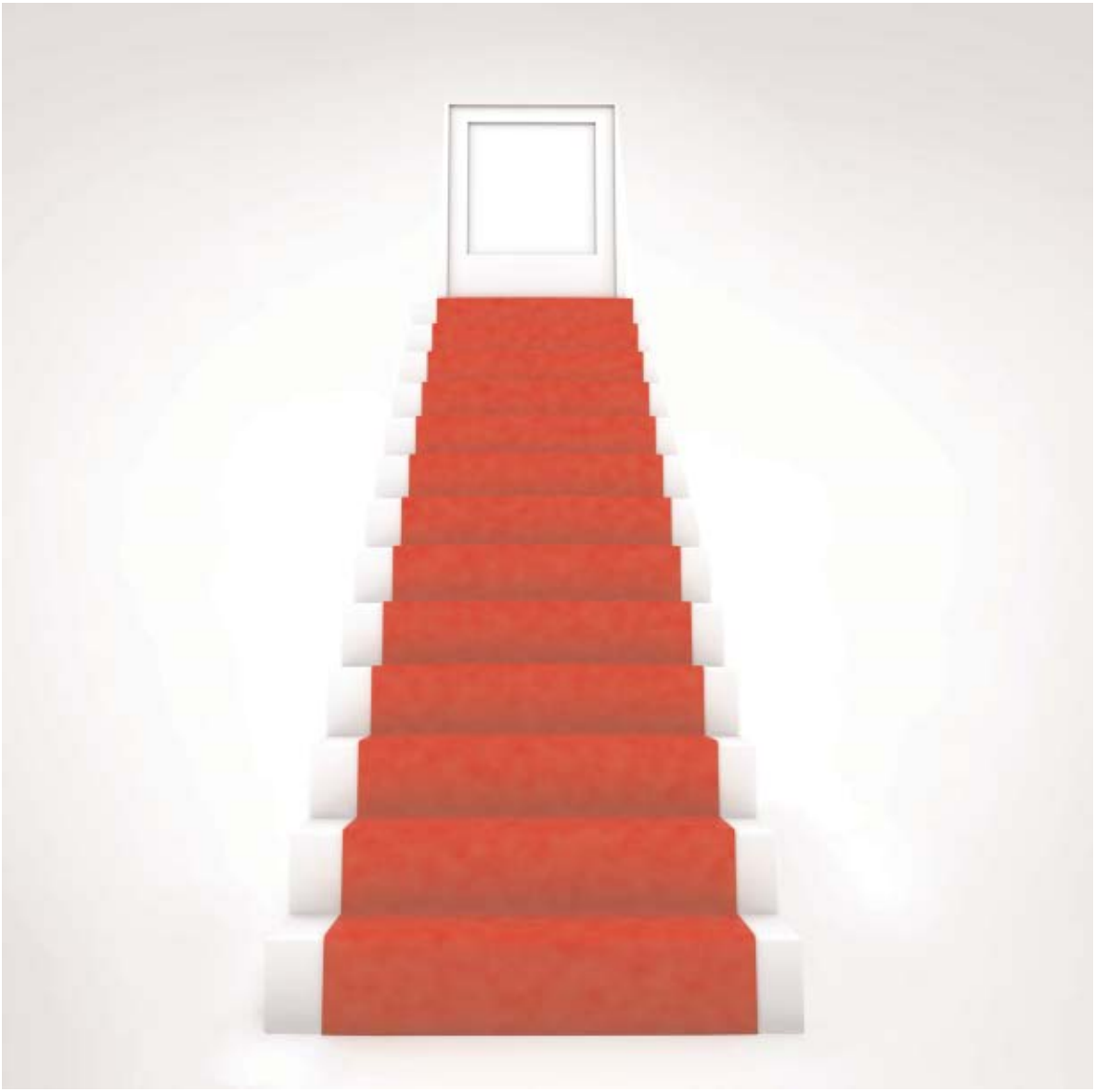

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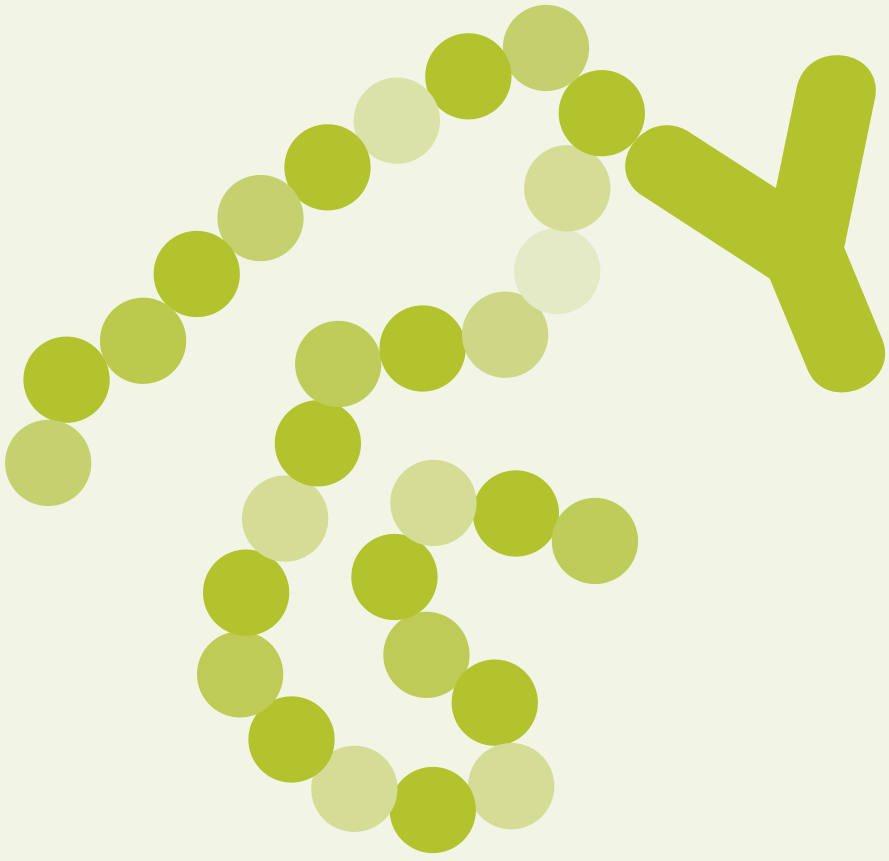

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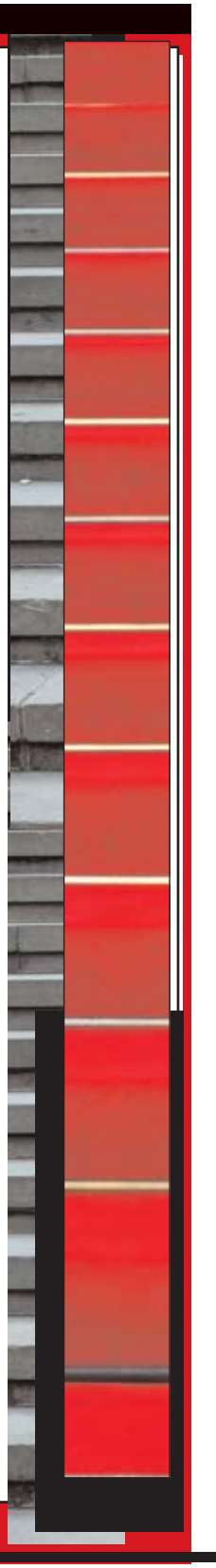

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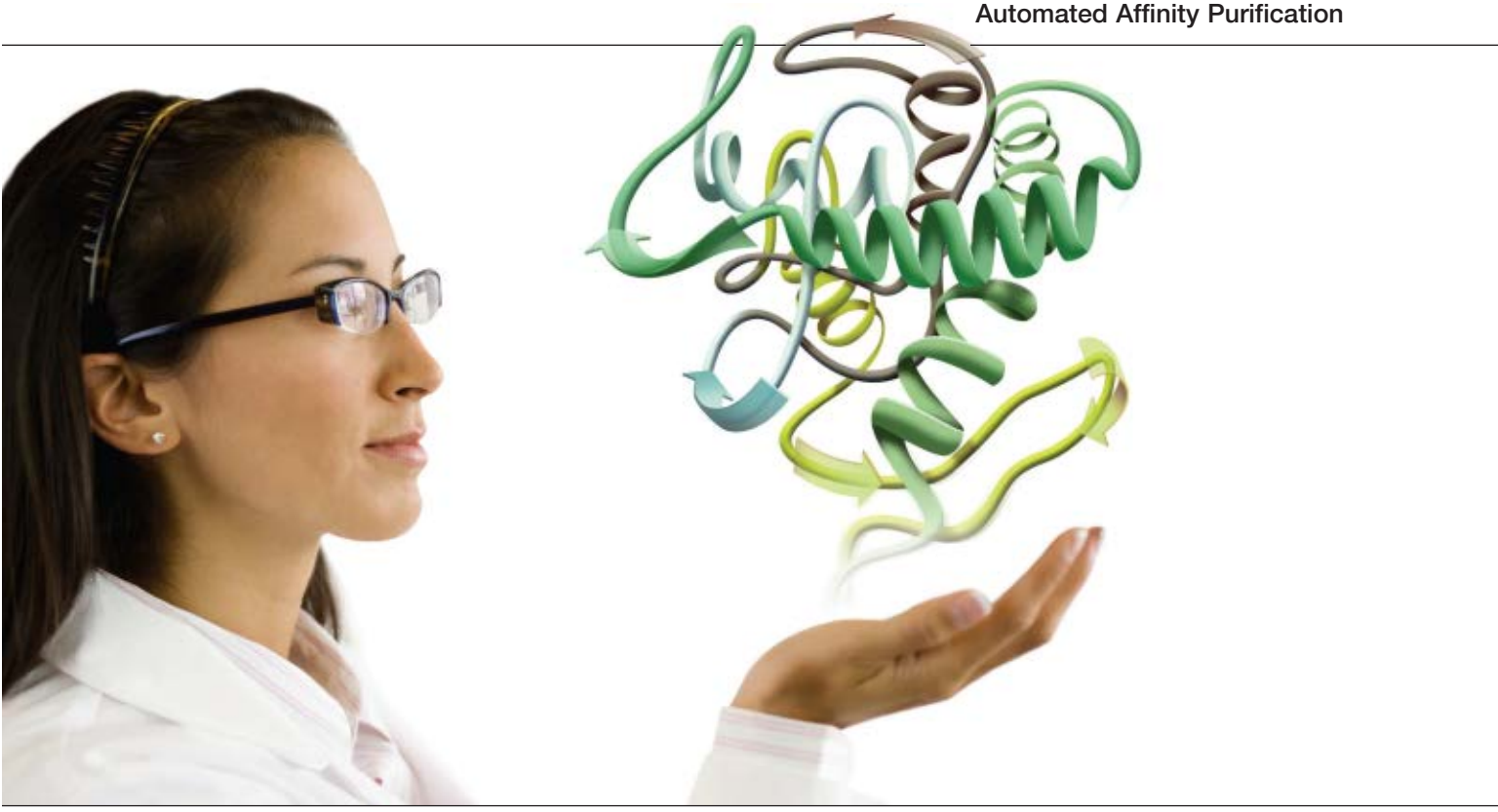

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There's a lot of talk about micromanagement in most every work situation. In this issue of Lab Manager, we address both ends of the micromanagement spectrum — working with a micromanager and being a micromanager. (All of us probably fit into one category or the other.) The guest editorial from Martha Casassa talks about how to deal with a micromanager and the Human Factors column by John Borchardt covers breaking your own micromanagement tendencies. Best of luck! -PG

MICROMANAGERS: Gaining Your Independence

Does your boss tell you exactly how to do your job? Is every step of your project scrutinized for compliance with your boss' perception of how to do it? Is the big picture being broken down into pixels for you? Then you need to manage your micromanager in order to stay satisfied and growing in your job and career. The challenge is to gain control and retain a good working relationship.

The micromanager is afraid to fully delegate. They are worried they won't know until too late if something goes wrong. Communication is key to resolving this. Let your boss know that when given a project you work best if given a goal and the guidelines or rules to follow and then be allowed to determine the path to that goal. Be sure to engage your boss in this approach, however. Ask if this is agreeable to them. Ask about the overall timeline and especially how frequently you should communicate your progress. How do they want their communication — written, informal meeting, phone, etc.? Are there any specific issues you need to be aware of for high priority communication? This is where you meet their needs. Establish a firm plan for checkpoint meetings and let your boss know you value his/her feedback to insure the best outcome. Keep to your communication plan diligently. The more your boss sees you working competently and efficiently without constant oversight the more freedom you will achieve.

If your boss is immune to this approach, however, the next step is a frank discussion. Set up a meeting to discuss the project management process at a time when there is no project to avoid the perception of a complaint. Communicate that this is an opportunity for improvement. Let your boss know how their behavior affects you, your job satisfaction, and your personal and professional growth. Be honest. Stick to behaviors you've experienced and how you'd like to see them change. Be specific. This is akin to a performance evaluation for your boss. In the end you should establish behavior goals for the next time work is delegated. This is not easy to do, but is necessary to gain the independence you desire while maintaining a good working relationship with your boss.

***Martha Casassa**, MS, CLD(NCA), MT(ASCP) is the Laboratory Director at Braintree Rehabilitation Hospital. Prior to this she was Laboratory Manager at Milton Hospital and spent 15 years as Administrative Director for Braintree Rehabilitation Hospital. In both positions she has had multi-disciplinary oversight including Cardiology, Neurology, and, at Braintree, Radiology, departments. She has also worked in university and clinical research environments. With her management experience she is well aware of the pressures of laboratory management.*

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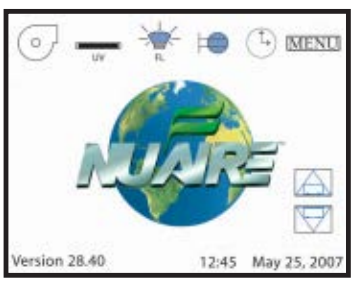

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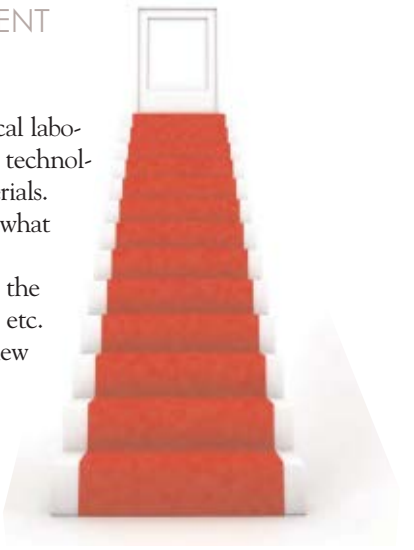
On-Boarding New Employees

EASING THE TRANSITION INTO YOUR LAB ENVIRONMENT



Laboratory environments are some of the most challenging work settings. Typical laboratories are complicated places with inordinate amounts of detail, sophisticated technology, safety and regulatory policies, data systems, and potentially hazardous materials. Navigating through this can be challenging even for a seasoned employee, but what about the new person?

Even if they have years of experience, a new employee still has to adapt to the company's culture, become familiar with their surroundings, form relationships, etc. So, it's understandable that a certain amount of stress can be expected with a new job.

As managers, it is our responsibility to ease a candidate's transition into a new work environment and make it a positive experience. The effort a company invests right from the start to ensure that this process is seamless is vitally important. Therefore, having comprehensive on-boarding tactics in place is something every company should consider.

ON-BOARDING: THE KEY FIRST IMPRESSION

Investing in an on-boarding program is an investment in your employees.

First impressions can make or break the overall meeting experience between a new hire and the employer. When on-boarding new employees, the key to a successful first impression is to minimize the unknown and provide a welcoming atmosphere for every candidate that walks through the door.

When designing an on-boarding program, the overall process should be thorough, but not overwhelming. Don't throw too much at the new hire at one time. Space out the process to avoid burnout. Employees should feel valued and supported through every step of the process.

To make a lasting impact on your new hires, consider the following components for your company's on-boarding program.

NEW HIRE CHECKLIST

An effective on-boarding program should be initiated even before an employee's first day. Because so many things need to be accomplished before, during, and after an employee starts, develop a new hire checklist if one does not already exist.

The list should include typical protocols and procedures such as administrative tasks, issuance of computer passwords and personal protective gear, review of policies, safety training, and other items that are relevant to the laboratory.

Logistics such as ordering name plates, arranging work space, granting computer access, and gathering protective gear should be taken care of well in advance of an employee's start date.

Consider prioritizing items on the list to ensure the most important things are accomplished first. Due dates and/or timelines to accomplish each task works well, and will help everyone manage their time efficiently.

EMPLOYEE ORIENTATION MANUAL

An employee orientation manual is intended to welcome new employees and share information on your company's services, benefits, policies, procedures, etc. Typical

Bill Lemons

manuals include an overview of the company, business conduct and ethics, dress code, hours of operation, descriptions of various departments like HR, etc.

While hard copies are typically provided to all new hires either prior to or the first day of employment, consider posting this manual to your company's Intranet. This ensures that all materials included in the manual are up-to-date and easily accessible.

FACILITY TOUR

If a facility tour did not occur during the initial hiring process, then make this a priority when the employee begins employment. If the laboratory is adjunct to a larger facility, such as a manufacturing or research facility, then a tour of the lab, as well as the other departments is in order.

There are a number of things that can be accomplished by the tour. It is a great opportunity for the new hire to meet fellow employees and to become familiar with their new surroundings. The new employee will also gain a better understanding of what the company does, the products they produce and the customers they may serve.

WELCOMING COMMITTEE

Form a welcoming committee for any new hire. The key here is to break the ice and to make sure the new employee is comfortable with those they will be working with. As mentioned previously, the tour is really a facet of the welcoming committee.

Lab management should be an integral part of this committee. Managers need to make it a priority to schedule one-on-one time with the employee to ensure that the new person hears from the top of the organization.

Lastly, consider pairing the new hire with a seasoned employee to serve as a mentor. A mentor can be an invaluable resource, especially in a lab setting. If a new employee has a question about company policies or needs any type of assistance, they can get instant feedback from this point of contact.

VISION, MISSION, AND VALUES

One thing that can get overlooked during the on-boarding process is a thorough review of the company's or laboratory's vision, mission, and/or value statements. Discuss these early rather than later to demonstrate a commitment to the values that guide the company and the ethics by which the laboratory conducts business.

While the orientation manual should reference these statements, it's important to review this information in-person with the new hire. In addition to having them read and sign these documents, discuss the contents with the new hire to ensure that they understand their meaning. After all, these statements are the very principles by which companies are founded.

SAFETY TRAINING

Safety training is a critical component of the on-boarding process. Even if a candidate is familiar with similar equipment from previous employment, they need to become accustomed with the layout and operations of their new environment. Base your training on the philosophical approach that every accident is preventable.

Reinforce policies, procedures, and work requirements with regard to wearing personal protective equipment, operating laboratory instrumentation and equipment, handling of hazardous materials, and locating safety equipment such as showers, eye washes, and first aid stations. Additionally, have new employees review the MSDS information for all chemicals they will be handling.

EMPLOYEE REVIEWS

Whatever review process you choose to incorporate, having one in place is key to overall employee development. It's important for the manager to check in with the new employee on a regular basis to ensure that they are making progress. There is merit to having as many as three meetings per month in the beginning to discuss matters such as overall impressions, job responsibilities, current workload, performance objectives and expectations, goal setting, etc.

FINAL THOUGHTS

Successfully transitioning a new employee begins with a defined process. Having strategic on-boarding procedures in place will help to ease employees into their new work environment and prepare them for a future career with your company. Investing in such a program is an investment in your employees. The payoffs could lead to increased productivity, higher retention rates, improved safety, and better employee moral.

Bill Lemons *is a regional director for Kelly Scientific Resources, a leader in clinical and scientific staffing solutions. For more information, visit www.kellyscientific.com.*

Hiring and Retaining Temporary Employees

EMPLOYING CONTINGENT WORKERS OFFERS LABORATORIES STAFFING FLEXIBILITY WITHOUT LONG-TERM COMMITMENTS

Changing business needs have led to increased use of contingent workers. In 2005, America's staffing companies employed an average of 2.9 million temporary and contract workers per day, according to the American Staffing Association's (ASA's) quarterly employment and sales survey. This is an increase of 8.7% over 2004. Staffing firms earned $69.5 billion from placing temporary and contract employees in jobs with their clients. Over the next decade, the U.S. temporary staffing industry will grow faster and add more new jobs than any other industry, according to the U.S. Bureau of Labor Statistics, a branch of the federal government.

Increased use of contingent workers often requires lab managers to integrate their core employees and temporary employees.

These are more than just typists and file clerks. Companies use staffing firms to provide temporary employees in highly skilled positions often requiring advanced degrees. For example, according to the Bureau of Labor Statistics, in 2001, 6.4% of temps worked in technical jobs, 21.0% in professional and managerial positions, and 9.3% in information technology. Trade show booths of temporary staffing firms specializing in placing scientists and lab technicians have become a common feature at the National Chemical Exposition held in conjunction with American Chemical Society national meetings.

It is well worth an hour or two of your time to personally interview candidates to reduce the chances of bringing in an unsatisfactory contingent worker.

Companies are increasingly using temporary employees in strategic ways that give them the flexibility to meet changing business needs. This is true for R&D as well as other functions. Labs can add staff to push R&D projects to commercialization more quickly and then reduce their payrolls without the disadvantages of a formal staff reduction. Strategic use of temporary employees is a result of corporate downsizing and restructuring notes Kathleen Christensen of the City University of New York and author of "Contingent Work: American Employment Relations in Transition" (Cornell University Press, Ithaca, NY). Labs often hire consultants as temporary trainers to conduct workshops and teach their employees important skills.

It is important for lab managers to remember that temporary employees don't work for the companies actually using their services. Rather, they work for the staffing firm that a company contacted when a lab manager temporarily needed a scientist, engineer, or lab technician. Typically, companies sign exclusive contracts with a staffing firm to supply their temporary personnel needs. Only if the staffing firm cannot supply someone with the needed qualifications can the company approach another staffing firm. Lab managers need to develop productive working relationships with their employer's contracted staffing firm and clear-

John K. Borchardt

ly specify the qualifications needed to fill a temporary position.

The different relationship between contingent employees and companies using their services (compared to the relationship between employers and their own employees) requires that managers modify their supervision techniques. This is true for the bench scientists supervising technicians as well as the group leader or department manager.

Another factor for lab managers to consider is that temporary employees have different motivations than conventional employees. Outstanding temporary employees can look forward to higher salaries in their current or future assignments. However, they can't expect promotions. One motivating factor may be the hope of being hired as a permanent employee.

HIRING TEMPORARY EMPLOYEES

Increased use of contingent workers often requires lab managers to integrate their core employees and temporary employees. Sue Marks, CEO of staffing firm Pinstripe (Milwaukee, WI), observes that more companies are using temps on project teams with their own long-term employees. As a result, she says, the selection and treatment of these workers is just as important as that for the core workforce.

Lab managers can use two strategies when hiring a contingent worker. The first is a minimum time investment approach in which the manager reviews résumés submitted by the staffing firm and chooses one individual. However, it is almost always a worthwhile time investment to interview one or more individuals for the temporary assignment, discussing their skills in some depth, assessing whether they will be compatible with the laboratory culture, and then picking the most suitable individual and contracting for their services. While you can immediately terminate the work relationship whenever you become dissatisfied with the individual's performance, valuable time has still been lost. It is well worth an hour or two of your time to personally interview candidates to reduce the chances of bringing in an unsatisfactory contingent worker.

RETAINING TEMPORARY EMPLOYEES

One issue when using temporary workers to complete projects on time is keeping these individuals at work until project completion. Stanley Nollen, Professor of Business at Georgetown University (Washington, DC), and Helen Axel, Senior Research Fellow at The Conference Board, a New York City research organization, characterize professional and technical temps as having "little or no attachment to the company at which they work…They have neither an explicit nor implicit contract for continuing employment." With few ties to the company, many temporary workers job hunt on a continuous basis and are more likely to resign unexpectedly than are company employees. What employers like most about contingent staffing, the ability to easily dissolve the company/temporary worker relationship is also a major cause of dissatisfaction with using contingent workers.

Contingent worker mobility calls for special retention techniques such as payment of a bonus if the temp is still at work upon successful completion of the project. However, managers shouldn't make promises they can't keep. In the case of high performance contingent workers, lab managers can promise to look for other temporary assignments within the company or to recommend the individual for employment with the company. However, they can seldom guarantee a new temporary assignment

Managers should also do what they can to make sure the workplace is a pleasant environment for contingent workers. In many workplaces, temps report company employees often treat them with a lack of consideration and respect. Managers can improve retention of contingent workers by counseling company employees to treat temps as they would each other.

One way of keeping contingent workers in harmony with your company's culture is to hire company retirees as temps. They understand the company culture and still have ties of loyalty to the firm. Many company employees still know them. Company retirees are also a known quantity. Managers can consult their personnel files to determine their strengths and weaknesses. For example, Dr. Lynn Slaugh, who retired from Shell Chemical as a Distinguished Scientist, the top of Shell's technical ladder, is one of many retired researchers who have worked as contract employees in one of the firm's laboratories.

Nollen notes that this type of hiring is particularly common after corporate downsizing. During downsizing some companies reduce their staffing levels too much, he observes. As a result, companies may hire back some of their former employees as contingent workers. Helen Axel sees fewer quality problems with such temps "because they have a track record when you hire them."

CONTINUING EDUCATION

Providing continuing education opportunities could be an effective retention tool for some temps, particularly younger ones. An increasing number of firms that supply contract laboratory workers, such as Kelly Technical Services and Manpower, Inc., are providing continuing education courses for their employees. It's a win-win situation. By increasing their qualifications, staffing firms can

charge companies higher fees for their services. The higher fees result in higher salaries for contingent workers increasing the likelihood they will work longer for companies using their services.

CHANGING PROJECT STAFFING LEVELS

R&D staffing levels are set in response to the need for employees on various projects. In the initial stages of an R&D project, company employees work on new product and manufacturing process concepts. These are usually full-time company employees although some may be highly trained consultants often with quite specialized skills. As projects move into process optimization and scale-up phases, additional scientists, engineers, and technicians often are needed to operate a pilot plant and perform analyses. The people brought in to do this are often contingent workers. Then as the product or process is commercialized, analyses are standardized and production is moved to a full-scale plant, these contingent employees are let go while company employees move on to other R&D assignments.

This enables employers to avoid the morale and other problems associated with staff reductions, says Denise Rousseau, Professor of Organizational Behavior at Carnegie Mellon University in Pittsburgh and author of "Psychological Contracts in Organizations: Understanding Written and Unwritten Contracts" (Sage Publications, Thousand Oaks, CA). Conducting a staff reduction, even when done with compassion and sensitivity, is emotionally devastating for everyone involved — including many managers. Dr. Bill Carroll, Vice President of Research at Occidental Chemical and former American Chemical Society president, has spoken movingly of the emotional anguish he experienced in having to conduct a staff reduction at his firm. Survivor syndrome, the negative emotions felt by employees who have survived a staff reduction, can reduce workplace productivity and job satisfaction. By hiring contingent workers whose tenure is understood by all to be limited, employers avoid many of the negative emotional consequences of staff reductions.

DOWNSIDES OF USING CONTINGENT WORKERS

Besides having little loyalty to the company, another downside is that using large numbers of temps instead of hiring their own employees can undermine staff morale. Economist Ann Davis at the Bureau of Economic Research at Marist College (Poughkeepsie, NY) believes the presence of contingent workers serves as a constant reminder to regular employees that they can be replaced. Carol Harvey, Associate Professor of Management and Marketing at Assumption College (Worcester, MA), believes company employees won't remain compliant and motivated if they believe contingent workers could take their jobs. Their fears can surface in the form of lower productivity and increased employee turnover. They can also reduce employee focus on their jobs and result in a larger number of laboratory accidents.

Contingent workers can provide more than a band-aid solution to temporary staffing shortages.

USING TEMPING AS A STAFFING SCREENING TOOL

Many contingent workers hope to leverage their temporary assignments into full-time positions — and many do. A 2006 ASA survey of 13,000 current or former temporary and contract employees indicated that 53% of those who remained in the work force moved on to permanent jobs.

Anecdotal information included in the ASA survey indicated that "temp-to-perm" working arrangements are growing rapidly in popularity. This trend is changing the way some laboratories recruit new employees. For example, the manager of the Surfactant Applications Group at Shell's Westhollow Technology Center (Houston, TX), Dr. Edwin Rosenquist, repeatedly hired laboratory technicians in this

manner. Only the best contract employees received job offers from Shell after he and the supervising chemist evaluated their work as temps for six to twelve months. The company has recently used the same approach in hiring young analytical chemists. Familiarity with the contingent employee's work can help companies afford incorrect employment decisions when hiring permanent employees. Common employment factors such as inflating qualifications on one's résumé become less of a concern when managers and coworkers have seen first-hand how well the contingent worker fulfills his/her job responsibilities.

SUPERVISING TEMPS

Different supervision techniques for temporary employees are needed for two reasons. The first is the limited and sometimes uncertain duration of their employment. The second is that temporary employees actually work for the staffing company that provides their services, not for the laboratory itself.

When supervising or working with contingent employees, lab managers need to be aware that these individuals are unfamiliar with the employer's policies and procedures. In particular, lab managers should verify that contingent laboratory workers have the proper safety equipment such as safety glasses, take company safety courses, and follow company safety procedures.

Lab managers should remember that the staffing firm, not their own employer, actually pays the contingent worker's salary (paying them out of the fee paid to the staffing firm). You should limit salary discussions by suggesting the temp ask the staffing firm these questions. Of course, if you're happy with the contingent worker's performance, call the staffing company and let them know. A delayed raise could result in an excellent contingent worker accepting a more lucrative temporary or permanent assignment with another firm.

The contingent worker's limited loyalty to the company means he/she is more likely to need closer supervision that a company employee. Like a new employee, the temp's capabilities and diligence often are unknown. However, managers shouldn't constantly stand at a temporary technician's shoulder being sure he/she is working and shouldn't ask others to frequently report on the temp's behavior. Contingent laboratory employees should be given clear deadlines with their assignments. Initially, it is a good idea to hold informal daily discussions with the temp to discuss daily progress and discuss future work. As contingent technicians, scientists, and engineers become more familiar with their assignments, this close supervision often becomes less necessary and informal weekly reviews of progress frequently suffice.

Another important consideration is that lab managers need to be sure that temporary employees are aware of confidentiality requirements both for the proprietary information they learn on the job and the intellectual property that they create. This intellectual property belongs to the company not to the contingent employee or the staffing firm.

Finally, the presence of temps in the laboratory often means managers must adapt their management techniques for company employees. They must be prepared to deal with the resentment many company employees feel towards contingent workers particularly after a lab downsizing. Even in the absence of staff reductions, bringing in relatively large numbers of temps can undermine company employee morale. As noted above, the presence of contingent workers serves as a constant reminder to regular employees that they can be replaced.

THE STAFFING COMPANY PERSPECTIVE

Staffing firms succeed by maintaining a roster of highly qualified people they can provide to companies needing temporary staff members. The staffing firm's goal is to reduce turnover and thus reduce recruitment costs. Global staffing firm Adecco (global headquarters Glattbrugg, Switzerland), which employ 700,000 people in temporary positions in client companies, recently created a new position, "chief career officer," to help accomplish this. Bernadette Kenny has the responsibility of meeting the career needs of contingent workers so they stay with Adecco enabling the firm to provide quality temps to corporate clients. To do this, she supervises Adecco employee learning, training, and talent development.

WRAP-UP

By screening potential contingent workers, hiring them for suitable assignments and supervising them appropriately and effectively, managers and supervising scientists/engineers can assure that the contingent employment experience is rewarding for the temp, the manager, the client company, and the staffing firm.

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Laboratory Response Network, Part 2: LESSONS LEARNED

PART 1 OF THIS TWO-PART SERIES TOLD THE HISTORY OF THE LABORATORY RESPONSE NETWORK–CHEMICAL, WHOSE GOAL IS TO CREATE A PARTNERSHIP BETWEEN CDC AND STATE PUBLIC HEALTH LABS TO IMPROVE THE PUBLIC HEALTH RESPONSE TO A LARGE-SCALE CHEMICAL EXPOSURE INCIDENT. PART 2 REVIEWS THE PROCESS OF CREATING THE NETWORK AND ITS INHERENT SUCCESSES AND MODIFICATIONS.

In 1999, the Centers for Disease Control and Prevention (CDC) entered into the Public Health Preparedness and Response for Bioterrorism Cooperative Agreement (BCA) with 62 jurisdictions in the United States. Since the early days of the BCA, CDC has been working with the jurisdictions' public health labs (PHLs) to improve the public health response to a large-scale chemical exposure incident. Partly by plan and partly by trial and error, a network has been created in which different members contribute to the program based upon their interests and abilities, which benefits everyone in the network. Over the past five years, the CDC and its partners have not only created a functional chemical incident response network but have learned a number of important lessons.

In new undertakings, processes rarely proceed as initially planned.

In new undertakings, processes rarely proceed as initially planned. Identifying those aspects of a new program that are essentially correct and those that need to be modified is critical to the evaluation of that undertaking. Successful programs discover how processes can be improved and adapt. During the creation and implementation of the Laboratory Response Network–Chemical (LRN-C), an offshoot of the larger LRN and an initiative between the CDC and state PHLs to expand the PHLs' chemical terrorism response capability, many lessons were learned. The most important lessons will be explored below and include the following:

- Money can't buy happiness.
- If you can't do it, you can't teach it.
- Use critical resources for critical tasks.
- 24/7 emergency contacts don't work 24/7.
- Being dogmatic is for the dogs.
- Partners are necessary for networks.

MONEY CAN'T BUY HAPPINESS

Everything takes longer and is more difficult than expected

Adequate funding is critical for creating laboratory facilities and for stocking them with instrumentation, equipment, and supplies. Funding is also vital for paying laboratory employees' salaries. However, adequate funding is not always sufficient for obtaining qualified, motivated staff.

Hiring laboratory staff presents many challenges, including policy restrictions on the number of staff, availability of qualified personnel, and local pay scales. For the LRN-C, the funding available through the BCA is "soft money," dependent on ongoing funding for the continuation of the specific project. This is in contrast with permanent civil service positions in government agencies. To staff a special program, a government

Robert Kobelski

agency must often make the critical decision to either allocate existing staff to the program or to hire additional staff to meet the terms of the agreement and the needs of the program. An alternative to increasing the number of staff is to use contractors; this practice does not have the long-term commitment associated with hiring government staff positions but may cost significantly more.

Hiring either civil service staff or contractors requires people who are available and have the requisite education and technical expertise. Low government pay scales add to the difficulty in finding qualified and interested people. When the LRN-C expanded from five to 62 labs, approximately 40 Ph.D.-level, or equivalent, analytical chemists with the necessary skills and experience — and the willingness to work for salaries well below the local private sector pay scale — were needed immediately. In many cases, these staff positions were filled by people graduating from undergraduate or graduate schools who could not find private sector positions because they lacked practical experience. Often, these staff members would gain experience by working for the LRN-C for a year or two and then would leave for more lucrative employment in the private sector. This created a significant turnover in PHL staff. Ironically, the LRN-C, a program with adequate funding to have completely staffed all labs in the network on day 1, has, years later, the equivalent of almost one opening per laboratory.

Hiring laboratory staff, even if it is authorized, is not often easy to do. Especially for civil service positions, the length of time between obtaining the authorization to hire and the actual arrival of the person onsite can be very long. As frustrating as this delay is for the local jurisdiction, it also adds a layer of complexity to the central coordinating entity's work. For example, the transfer of the first Level 2 analysis method, cyanide in blood, from the CDC to the PHLs took almost two years as labs slowly staffed to the required levels. This delay required that the CDC maintain a training schedule flexible enough to train PHLs on both old and new analysis methods at any time.

In addition, calibration materials used by the first labs that were trained had reached and exceeded their expiration dates before the last lab was trained. As a result, new batches of materials and the overhead costs associated with validating and characterizing these materials had to be assumed. On a regular basis, two to three batches of materials were needed for each method transferred. Coordinating the various aspects of the program that are highly dependent upon each other has been particularly challenging.

IF YOU CAN'T DO IT, YOU CAN'T TEACH IT

But just because you can do it doesn't mean you can teach it

Effectively transferring analysis methods from the CDC to the public health labs was identified as the CDC's Technology Transfer Laboratory's key activity. CDC technical subject matter experts (SMEs) would train the PHL staffs. However, because an excellent scientist is not always a skilled developer of training materials or an effective instructor, people with adult education experience and finely honed technical skills were hired as the program's primary instructors. All the primary instructors had earned post-graduate degrees in chemistry and had taught in high school, college, and/or industrial settings. These instructors had a combined 100 years of professional experience.

The training program's desired outcome was that students could perform a specific analysis with adequate accuracy and precision to produce interpretable results. Ideally, after training, the students should also understand the science underlying the analysis, but, for the short term, the student being able to perform the specific analysis was sufficient for training purposes.

The sample preparation, instrumental analysis, and data reduction techniques used for analyzing chemical warfare agents (CWAs) were commonly employed by a large segment of the chemical analysis community, but the integration of the parts and the operational aspects of the specific instrument system and controlling software required hands-on training. Because the students needed hands-on experience, the training program provided a low student-to-instrument ratio so that students had maximum direct experience with the analysis. Similarly, the program employed a 2:1 student-to-faculty ratio for the hands-on parts of the course, so that each of the two teams of two students would have one instrument and one instructor at its disposal.

The training team leader was one of the experienced post-graduate-trained staff members and was assisted by a cadre of lab instructors, who were bachelors- and masters-level staff members with about five years of hands-on experience. The lead instructor was responsible for the theoretical aspects of the training, and the lab instructors took primary responsibility for the practical aspects. With time and additional experience the lab instructors, like graduate students in a university setting, developed their skills and expanded their teaching beyond the practical aspects of the analysis methods.

Because the course developers and deliverers needed to be qualified and experienced scientists, the instructors could not engage in training activities 100% of their time and still retain their technical skills and credibility. After some trial and error, the program targeted the distribution of the instructors' time, after accounting for overhead activities, as 35% for course delivery, 35% for course development, and 30% for technical/professional development. Instead of having high-level skills in the broad areas of clinical chemical analysis and adult education, the instructors had to be subject matter experts for each analysis that they would be transferring. Thus, the 35% of their time allocated for course development included developing proficiency with a specific analysis and developing course materials. The 30% of their time targeted for technical/professional development was for growth in areas that expanded the network's capabilities, such as analytical method development; instructors were also encouraged to present their work at national professional meetings and in peer-reviewed journals. Allowing the instructors to continue their personal development has both maintained their credibility with the student population and created a stable instructor corps.

USE CRITICAL RESOURCES FOR CRITICAL TASKS

Don't do what others can do

With most programs, there are tasks that only the program can perform, tasks that the program would like to perform but other entities can perform almost as well, and tasks that the program does not want to perform and other entities already perform well. A program has to determine how best to use other entities to perform those tasks that, because of staffing or other limitations, it cannot perform and that would jeopardize its mission if not completed.

In the LRN-C's case, the network was able to leverage existing external resources in instrument operation training and in the production of calibration and proficiency testing (PT) materials. Most instrument vendors provide instrument operation training to support their customer base. If a standard instrument operation course met the needs of the LRN-C training program, such as elemental analysis using the PerkinElmer ELAN DRC, that course and its delivery at the PHLs were included in the instrument purchase contract.

However, not all standard operation courses transferred so easily to the PHLs. For example, the gas chromatography–mass spectrometry (GC-MS) and liquid chromatography–tandem MS (LC-MS/MS) programs were more complicated and included multiple layers of training. Standard instrument operation training would not be adequate to develop proficiency in GC-MS and LC-MS/MS due to the added complexity of the analysis techniques. The hardware/software training provided by instrument manufacturers did not, and could not, adequately address the science associated with these techniques. The collaboration among CDC SMEs, who were developing training classes designed to reinforce operational skills and also to explore the full capabilities of the instruments, and the delivery of these classes by selected technical support staff of Agilent Technologies or Applied Biosystems provided the PHLs with instrument understanding beyond that gained in vendors' operator training classes.

The LRN-C's proficiency testing program initially included the production of calibration, quality control (QC), and PT materials in sufficient quantities to last at least one year and hopefully longer. To accommodate methods that had a throughput of approximately 25 samples per day, an ideal materials stockpile that would address a 10,000-sample incident, would require 400 vials for each level of a seven-level calibration for each validated method. In addition, generating the thousands of vials that would be required for each lab to characterize QC materials and PT challenge materials would easily exceed the capacity of the PT staff. The solution was to identify vendors who were already preparing standard solutions, commonly for environmental testing, and who were willing to expand their programs into clinical matrices. As the network expanded to more than 40 labs, each performing multiple methods, the use of external resources for materials became the only viable option and an LRN-C materials program was created. Vendors could prepare the samples in flame-sealed vials and also stock, sell, and ship the materials to PHLs that had completed their analysis method training and were ready for validation.

24/7 EMERGENCY CONTACTS DON'T WORK 24/7

Or in emergencies

The LRN-C was chartered as an emergency response network. Therefore, when an emergency arises, CWA samples must be directed to the right people and those people must perform the analysis in time to meet response needs. To evaluate the responsiveness of the network, the LRN-C created Emergency Response Exercises. At the start of these exercises, an LRN-C quality assurance (QA) staff member would call the PHL 24/7 emergency contact listed on the LRN-C web-

site and advise that contact that samples would be arriving at his or her laboratory by priority, next-day delivery. These instructions provided the PHL with approximately 24-hours notice. When the samples arrived, the PHL had to analyze them for one specific analyte and report the results as soon as possible through the LRN-C website reporting mechanism.

Although PHLs were given repeated warnings that a training exercise was starting on a specified date, the results of the first Emergency Response Exercise were more enlightening than satisfying. The LRN-C placed calls to ten PHL emergency response numbers and requested to be connected with the person responsible for chemical terrorism response at each PHL; in seven instances, the LRN-C found no connection between the emergency response number and the person the network was trying to reach. In contrast, one laboratory emergency contact mechanism worked flawlessly, and that laboratory reported its accurate results less than four hours after the arrival of the samples. When the results of this first exercise were reported to the network by teleconference, performance was dramatically improved for all subsequent emergency response exercises.

BEING DOGMATIC IS FOR THE DOGS

If you don't bend you break

If it is to be successful, a lab network must be allowed flexibility in evolving its processes and activities. Flexibility was critical to the LRN-C's performance in supporting method development activities at Level 1 labs, in supporting Level 1 analysis methods for Level 2 labs with the relevant instrumentation, and in evolving the QA program with PT materials and exercises.

The staffs at Level 1 labs are highly qualified analytical chemists with access to all program instrumentation. In the early days of the program, these chemists had many weeks where their time was not directly allocated to network activities. Because of the plethora of toxic industrial chemicals that might be used as terrorist weapons or that might be involved in large-scale industrial accidents, the LRN-C offered the Level 1 labs the opportunity to help develop analysis methods needed by the network for these chemicals. Each of the five Level 1 labs selected five of the approximately 25 high-priority analytes and began work. The CDC provided technical support to help with any analytical issues and financial support to finance the custom synthesis of metabolites and stable isotope-labeled internal standards. As a result of this mini-program, additional GC/MS and LC-MS/MS methods that were developed in Level 1 labs have been scheduled for transfer, which has increased the network's potential capability without using additional CDC staff and with only a minimal cost increase.

Although many of the Level 2 PHLs had no chemical analysis capability at the start of the program, a limited number have already established highly successful programs with advanced instrumental capability. These labs requested the ability to train on the same advanced methods as Level 1 labs. Because the well developed Level 2 labs were allowed to train on more advanced methods, the network was able to rapidly expand the number of surge capacity labs, because three of the five new Level 1 labs were already performing most of the transferred methods as Level 2 labs. This program is ongoing, and the expansion of instrumental capability at the Level 2 labs — currently, more than half have purchased LC-MS/MS capability using state funds — has required engaging the Level 1 labs to train the Level 2 analysts for LC-MS/MS methods.

No part of the LRN-C has been more flexible than its QA program. The QA program started as a proficiency testing program and has developed and changed as program needs were better defined. In the beginning, the program's scope was limited to assessing the network labs' proficiency through regularly scheduled PT challenges. This assessment required consistent, high-quality materials for calibration and quality control, which prompted the creation of the LRN-C materials program. Although the PT challenges could assess technical proficiency, they did not assess how well the emergency response network responded to emergencies. As a result, Emergency Response Exercises were created, in which the labs' ability to respond to emergency samples and to produce reliable results were combined into unscheduled PT challenges that would better reflect the PHLs' ability to perform their mission. All PHLs are required to demonstrate their ability to collect, package, and ship clinical samples to qualified laboratories; this requirement led to the creation of a mandatory exercise that tests this ability annually.

PARTNERS ARE A NECESSITY

What would a network be without them?

The key component of any successful network is the partners who comprise the network. The LRN-C has built its success upon the participation of partners who are both external and internal to the CDC. External partners include the PHLs, who are the majority mem-

bers of the network; the instrument vendors; the Federal Bureau of Investigation; and the Association of Public Health Laboratories (APHL); the latter two entities helped to create the LRN in conjunction with the CDC. Internal partners are both the technical and administrative components within the CDC's National Center for Environmental Health's Division of Laboratory Sciences; certain components of the CDC's Coordinating Office for Terrorism Preparedness and Emergency Response; the components of the CDC's National Center for Infectious Diseases that created the LRN website and secure communication capability; the former CDC Public Health Program and Practice Office (PHPPO), the enterprise learning office at the CDC; and the National Laboratory Training Network (NLTN), co-sponsored by both the CDC and the APHL.

The program's instrument vendors have been vital in making the network's hardware and software resources run smoothly. Because the program purchased multiple packages of identically configured instruments, the vendors provided excellent discounts and collaboration on training activities. The PHLs used some of the money saved from discounted instrumentation to purchase extended service contracts, which have assured support when needed and have been independent of a jurisdiction's year-to-year variation in funds allocation. The willingness of two vendors, Applied Biosystems and Agilent Technologies, to collaborate on a joint training class has allowed the PHL staffs to bridge the multi-vendor gap in instrument operation and integration. In addition, Advion Bioscience's collaboration with the Level 1 lab at the Wadsworth Laboratory in Albany, NY, provided the network with an analysis method that can produce a multi-analyte result in less than one minute.

After expanding from five to 62 members, the LRN-C realized that its training had to expand beyond analytical method technology transfer. The network's first computer-based training (CBT) program was a product designed to lead students through the calibration of the Agilent 5973 mass spectrometer. Inexperienced with this type of training, the network turned to PHPPO's Division of Laboratory Systems (DLS) for assistance. With PHPPO/DLS's help and guidance, the LRN-C produced its first CBT product that familiarized new lab employees with instrument operation before the vendor delivered onsite training. By collaborating with the NLTN, PHPPO/DLS also removed the network's burden of training the network labs in sample collection, packaging, and shipping. The NLTN already had subject matter expertise in the packaging and shipping of clinical samples and had access to appropriate facilities across the country. The NLTN scheduled and delivered hands-on packaging and shipping classes from Boston to the Pacific Basin for the PHLs, which allowed the LRN-C's analytical subject matter experts to spend their time training in their areas of expertise.

CONCLUSION

The contributions of the PHLs to the LRN-C are numerous and ongoing. At their start, many of these labs faced instruments being delivered to a loading dock but having nowhere else to go because the labs' health departments did not have chemical laboratories. Lab employees had to work within their local system to create a laboratory, including acquiring physical facilities, power, high-purity gases, safety cabinets, and sample storage, while trying to meet program requirements for training, validation, and proficiency testing. At the other extreme, established PHLs in the original Level 1 labs struggled along with the network as the program grew and changed and also were active contributors to method development and method improvement activities. Now, these original Level 1 labs are shouldering some of the training burden to make the network stronger and more capable. On a day-to-day basis, the Level 1 and Level 2 labs are not only engaged in CDC lead activities but are reaching out to other responders in their jurisdictions, to hospitals, to civilian support teams, to poison control centers, and to other jurisdictions to improve the United States' response to a chemical exposure emergency.

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Adipose Tissue as a New Source of Adult Stem Cells

AN ALTERNATIVE TO BONE MARROW ISOLATION

The major sources of adult stem cells are bone marrow and umbilical cord blood. Mesenchymal stem cells (MSCs) isolated from cord blood are low in number and fairly restricted in plasticity.[1] Bone marrow is rich in MSCs and is the predominant source of these cells. Bone marrow isolated MSCs can consistently differentiate into fat, cartilage, and bone cells.[2] Until recently, no real alternative to bone marrow isolation was available.

The lipoaspirate from liposuction procedures has long been considered medical waste, much like umbilical cord blood was in the past. It is now widely recognized that adipose tissue is also an abundant source of adult stem cells.[2] Lipoaspirate is processed into a heterogeneous, non-adipocyte cell population, referred to as the stromal vascular fraction (SVF). Under specific culture conditions, a subpopulation of the SVF cells adheres and proliferates into a more homogenous cell population referred to as adipose-derived stem cells (ADSCs). To date, ADSCs have consistently demonstrated their phenotypic and functional similarities to bone marrow-derived cells.

To date, ADSCs have consistently demonstrated their phenotypic and functional similarities to bone marrow-derived cells.

The number of stem cells that can be isolated per unit volume of lipoaspirate is approximately 10-fold greater than that from bone marrow.[3] Functionality or potency of mesenchymal cells is often established using colony-forming unit (CFU) assays, the most general of which is the fibroblast colony-forming unit assay (CFU-F). ADSCs are capable of forming CFU-F at an approximate frequency of 1 in 4 cells by passage two,[4] compared to 1 in 50,000 for marrow-derived cells.[5]

ADSCs are phenotypically very similar to bone marrow-derived MSCs after 1 to 2 passages. Functionally, ADSCs and bone marrow MSCs are also very similar.[3] Comparable efficacies have been observed for both sources of cells in preclinical applications. However, phenotypic differences observed on ADSCs at isolation and early passage may indicate a more primitive progenitor status. Primitive status would lend support to several groups who have reported successful transdifferentiation of ADSCs into endodermal vasculature and ectodermal neural progenitors.

Interest in ADSCs is continuing to grow in the scientific community, as evidenced by the ever-growing number of research journal publications. The demand for adult stem cells will certainly increase as the field of cellular medicine progresses into the future. Adipose tissue is an accessible, plentiful, and renewable source of adult stem cells.

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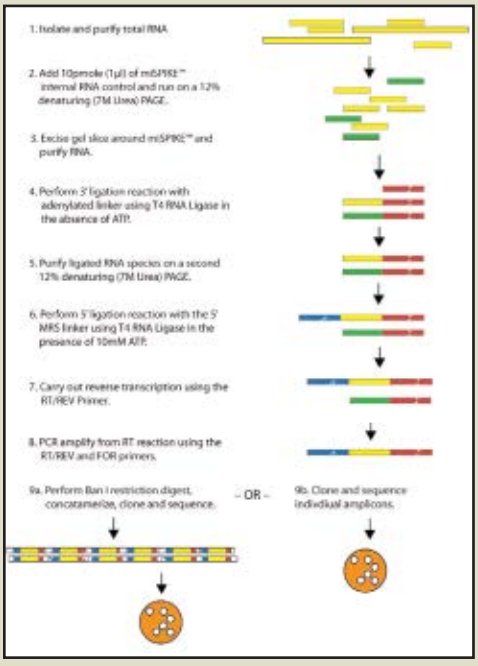
How it Works

Creating miRNA libraries

Problem: Small RNAs (including miRNAs, piRNAs, and endogenous siRNAs) are small, non-coding RNA molecules. Research shows that they have key roles in post-transcriptional gene regulation, such as cellular differentiation, cell death, and metabolic regulation. In general, an miRNA is composed of a highly conserved core sequence of 21–23 nucleotides within a less conserved precursor sequence, ranging in size from about 60 to over 120 nucleotides. Unfortunately, small RNAs are very difficult to clone.



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The system can be used for concatamer cloning or direct "shotgun" cloning; it also can provide PCR amplicons suitable for use with TOPO TA Cloning®* or pGEM® T-Easy** cloning vectors.

For cloning small RNAs lacking the 5'-phosphorylated end present in miRNAs, a modified kit — miRCat-33™ — has been developed, which uses 5' ligation-independent cloning. This makes it an excellent cloning system for the recently discovered *C. elegans* 5' tri-phosphorylated microRNAs, which would otherwise be omitted. Specific primers are also available to convert the resultant small RNA libraries using Roche/454 Life Sciences sequencing systems.

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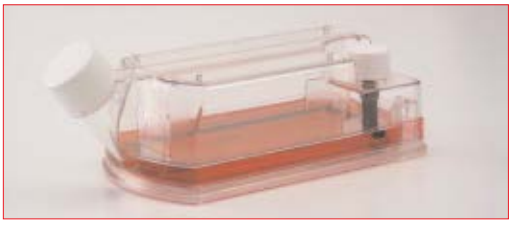

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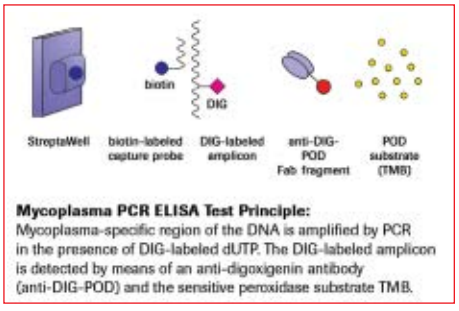

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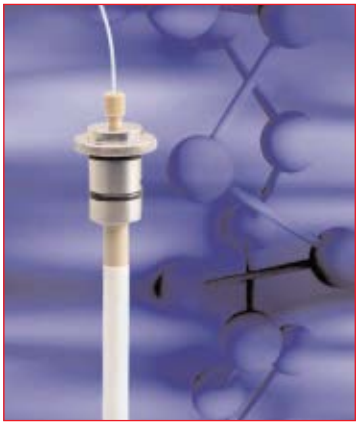

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MICROCENTRIFUGE

The Z216 MK refrigerated microcentrifuge features a brushless motor capable of attaining speeds of 15,000 rpm/21,380 × *g*. The control panel features a model LCD display with a large turn knob for changing parameters. The operator can quickly select and adjust speed, g-force, acceleration, deceleration, temperature, and the processing time.

Labnet International
www.labnetlink.com

PARALLEL CHEMISTRY MODULE

The Orbit parallel chemistry module is a high performance parallel reaction station for research and development chemistry. Part of the Atlas family of products, the compact module readily fits a variety of plates. It can accommodate different numbers of tubes and allows reactions to be heated to 280 °C with reflux or cooled to -40 °C.

Syrris
www.syrris.com

ION CHANNEL RECORDINGS

The Dynaflow Pro II system and its unique microfluidic chips enable ion channel recordings at high speed, high quality, and high accuracy. The system is widely used by both academia and big pharma companies for their research and drug screening. The system is easily installed and integrates with existing patch-clamp work stations.

Cellectricon
www.cellectricon.com

INFRARED DYE

The IRDye® 800CW infrared fluorescent dyes are used for protein and cellular assays, microscopy, and in vivo molecular imaging in animals for research purposes. The dyes were designed for labeling nucleic acids, antibodies, proteins, and peptides where there is a need for high signal, low background imaging.

LI-COR Biosciences
www.licor.com

DISPOSABLE BUCHNER FUNNELS

Americlean Buchner Funnels are used in the purification of large samples of reaction mixtures. Applications include purification of natural products, filtration, and others. Each funnel is made from polypropylene frits of 20-µm porosity. Standard size is 70 mm ID × 40 mm H, 25 g (90 mL). Other sizes are available upon request.

American Analytical
www.americananalytical.us

ANTIBODY-FREE CHROMATIN PRECIPITATION

Trypsin Gold is one of the most referenced proteases for mass spectrometry analysis of proteins by core labs. The protease is manufactured to provide maximum specificity and each lot is quality-tested and qualified for use with in-gel digestion and mass spectrometric analysis. Stability is ensured up to 5 freeze-thaw cycles, minimizing leftover reagents.

Promega
www.promega.com

lab agenda

DECEMBER 1–5, 2007
ASCB 47th Annual Meeting
American Society for Cell Biology
Washington, DC
www.ascb.org

JANUARY 26–30, 2008
LabAutomation 2008
Palm Springs, CA
www.labautomation.org/la08

JANUARY 31, 2008
Lab Ergonomics
Free Webinar–1 PM ET
www.viconpublishing.com/webinar

MARCH 1–7, 2008
59th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy
New Orleans, LA
www.pittcon.org

APRIL 6–10, 2008
ACS & AIChE Co-Located Meetings
New Orleans, LA
www.acs.org

APRIL 6–10, 2008
SBS 14th Annual Conference & Exhibition
Society for Biomolecular Sciences
St. Louis, MO
www.sbsonline.org

APRIL 12–16, 2008
AACR Annual Meeting
San Diego, CA
www.aacr.org

JUNE 13–20, 2008
XXVCIII International Workshop/Symposium on Rapid Methods and Automation in Microbiology
Manhattan, KS
www.dce.ksu.edu/conf/rapid-methods/

JUNE 1–5, 2008
56th ASMS Conference on Mass Spectrometry and Allied Topics
American Society for Mass Spectrometry
Denver, CO
www.asms.org

AUGUST 17–21, 2008
236th ACS National Meeting & Exposition
Philadelphia, PA
www.acs.org

NOVEMBER 15–19, 2008
Neuroscience 2008
Society for Neuroscience
Washington, DC
www.sfn.org

Selection of the Proper Multi-Mode Microplate Reader

The appeal of multi-mode microplate readers is easy to understand; they combine several measurement technologies such as absorbance, fluorescence (including fluorescence polarization and time-resolved fluorescence), and luminescence into one compact instrument. This powerful research tool offers scientists flexibility in assay compatibility along with high sensitivity.

In multi-mode readers, fluorescence detection is the mode with the widest range of applications. The optical designs used for fluorescence detection fall into two distinct categories: filter-based and monochromator-based. Understanding the differences, strengths, and weaknesses of each can help the decision making process when using or purchasing a multi-mode microplate reader.

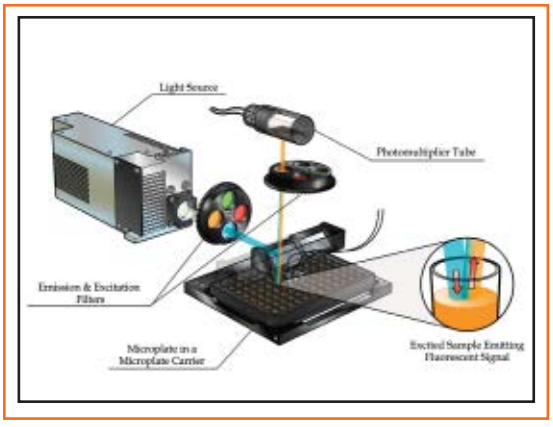

Figure 1. Filter-based Detection System in a Multi-mode Microplate Reader

FILTER-BASED DETECTION SYSTEMS

Multi-mode microplate readers with filter-based detection (Figure 1) use optical filters on the excitation and emission sides of the system. On the excitation side, white light coming from the light source is passed through an optical filter. The selected wavelengths illuminate the samples and excite fluorescent molecules. In response, these molecules emit a fluorescent signal, typically at longer wavelengths. This signal is captured by the emission optical system, purified by an emission filter, and measured by a photomultiplier tube (detector).

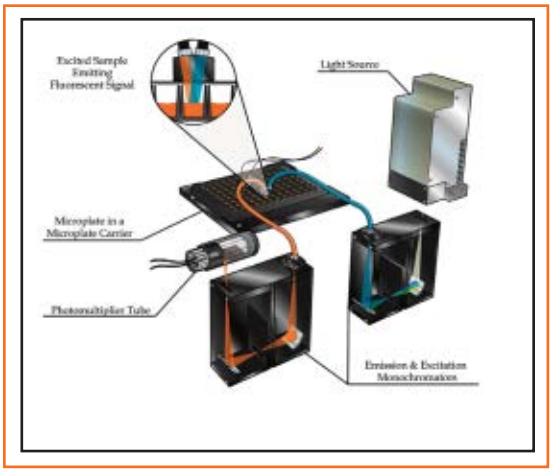

Figure 2. Monochromator-based Detection System in a Multi-mode Microplate Reader

ADVANTAGES OF FILTER-BASED DETECTION SYSTEMS

- Filter-based multi-mode microplate readers are generally less expensive than monochromator-based readers.
- Filters can have bandwidths from a few nanometers to greater than 100 nm. Narrow bandwidths provide best specificity for multiplexed assays, such as FRET assays, and wide bandwidths are especially needed in low-level fluorescent assays such as PerkinElmer's AlphaScreen® assays. A filter-based detection system can also be dedicated to a specific assay for maximum sensitivity.

Xavier Amouretti

- High light transmission efficiency on both the excitation and emission channels, combined with deep light blocking between the two channels, results in very high sensitivity.
- Rapid switching between two wavelengths for ratiometric assays with extremely fast reaction times is easily done with a filter-based microplate reader.
- In luminescence mode, a filter-based detection system allows for efficient light transmission when light filtering is required, in assays such as BRET and Promega's Chroma-Glo™.

DISADVANTAGES OF FILTER-BASED DETECTION SYSTEMS

- Separate filter sets are necessary for different applications with a filter-based detection system. Filters are purchased as needed and may require some trial and error before finding the appropriate filter set.
- Filters systems can't be used to perform spectral scans, which can be useful in assay development laboratories and for a few very specific applications.

MONOCHROMATOR-BASED DETECTION SYSTEMS

The newer technology of monochromator-based detection systems (Figure 2) in a multi-mode microplate reader use diffraction gratings to disperse light. By rotating the gratings, the wavelength range of interest can be focused onto an exit slit. An excitation monochromator is used to select the range of wavelengths to excite the samples and an emission monochromator purifies the signal before it reaches the detector.

ADVANTAGES OF MONOCHROMATOR-BASED DETECTION SYSTEMS

- Flexible wavelength selection is usually available in 1-nm increments and adjustments for new applications and wavelengths are uncomplicated with no additional cost to the user.
- Maintenance of accessories are unnecessary when using a monochromator-based reader.
- Monochromator-based microplate readers can perform spectral scans to study spectral shifts and profiles or to characterize new fluorophores.

DISADVANTAGES OF MONOCHROMATOR-BASED DETECTION SYSTEMS

- Monochromators are less efficient than filters at selecting a specific range of wavelengths. A comparable optical arrangement using filters will generate more signal and, thus, higher performance.
- More expensive optical components drive up the overall cost of monochromator-based readers.
- Monochromator-based microplate systems exhibit higher background noise and, therefore, less sensitivity and resolution, than cuvette-based analytical-grade instruments.
- Reagent injectors, used in flash luminescence assays and ratiometric fluorescent assays, are not commonly available on monochromator-based systems. This limits their range of application.

HYBRID-BASED DETECTION SYSTEMS

The most recent advancement in multi-mode microplate reader detection systems unites sensitive filter-based systems with flexible monochromator systems for increased versatility. By combining these systems in one unit, users benefit from each system's advantages while circumventing the limitations of each. This means that a wide range of diverse assays can be performed on one unit, with a significant cost savings compared to the purchase of multiple multi-mode microplate readers. Additionally, a hybrid-based detection system can provide flexibility and assay control for current as well as future assay demands. As a result, a higher level of convenience is possible, even as a laboratory's research techniques evolve.

SUMMARY

When weighing the purchase of a multi-mode microplate reader, the type of fluorescent detection system used should be among the most important criteria considered. Filter-based detection systems offer high sensitivity, but lack spectral scanning functionality. Monochromator-based detection systems benefit from flexibility and a wide application range, but can be deficient when it comes to sensitivity and are generally more expensive. Hybrid readers bridge the gap between the two existing detection technologies, combining them into one compact unit so that each can compensate for the other's weakness for true multi-detection.

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Writing Action Steps

Did you get to use all the colored markers you bought on your mind map? Are you now an expert at flowcharting and want to flowchart everything? Super, well now it's time to translate those pictorial representations of your process to paper. Yes, finally we're going to start writing. Before you open that word processor file or click that pen, let's remember what our P-D-C-A (Plan-Do-Check-Act) model suggests — plan the work. For the writing task we need to have an approach for how we're going to write our SOP.

Our approach will be to write SOPs from the perspective of the user. They are responsible for performing the work, so the SOP should be written with them in mind. One of the most effective ways of writing for the user is to write using action steps. The action step makes up the basic element of the SOP. An action step provides the direction to do a particular activity.

WRITING ACTION STEPS

The basic element of any action step is the imperative sentence i.e., a sentence that gives a direct command to perform a specific action. An action step answers the question "what is to be done?" Additional elements, such as cautions and condition statements, are used to increase the precision with which instructions can be communicated. There are a number of commonly accepted principles used to write action steps. Five of the most important principles are presented here and another five will be presented in the next article.

PRINCIPLE 1: USE SIMPLE COMMAND STATEMENTS

Begin the action step with a singular present tense action verb, such as "open."

Poor: The reading shall be recorded on the Data Collection Form.

Better: Record reading on Data Collection Form.

Next precisely describe the direct object of the verb. In the example above that is "reading." Complete the basic action step with supportive information about the action verb and the direct object. Supportive information includes further description of the object and the recipient of the object. The supportive information in the example above is "on Data Collection Form." Acceptance criteria, referencing, and branching are other types of supportive information and are described later.

Consider omitting the subject "you" because it is implied in the imperative or command structure. Unnecessary articles such as "a," "an," or "the" may be omitted, unless needed for clarity.

The words will, should, and must, which are often found in SOPs, are not part of the structure of an action step. The command form of the verb is equivalent to "shall," so their use should be avoided.

PRINCIPLE 2: KEEP ACTION STEPS SIMPLE

Write action steps using words that are easily understood by the users. Where a word is used that requires a definition, the definition of the word will be included as (a) part of that action step, or (b) as a note that immediately precedes the action step that uses the defined word.

Restructure the actions as needed to avoid using sub-sub-action steps. If necessary, break one section into two or more sections to simplify the step structure.

If someone other than the primary procedure user is responsible for performing an action step, then identify the person to perform the task directly above the affected step.

PRINCIPLE 3: AVOID THE PASSIVE VOICE

With the command structure suggested above, passive statements will be avoided. Passive statements are a weaker method of expressing action.

Passive: The pipette needs to be on the lowest setting for the operating range of the pipette.

Active: Adjust pipette to lowest setting for operating range.

Studies of human learning and reading comprehension have shown that readers pay more

Norm Moreau, PE

attention and comprehend best at the beginning of a sentence. Therefore, the most important word, the action verb, should come first. The passive voice can introduce a great deal of ambiguity into an SOP. The passive voice lends doubt as to who should perform the action. A step-by-step breakdown in the active voice will eliminate confusion.

The passive voice often reveals itself in the form of the verb "to be" or words that end in "ed." Different forms of the verb "to be" are: be, am, is, are, was, were, been, being. When you see these forms in your SOPs, consider rewriting them into the active voice.

PRINCIPLE 4: IDENTIFY THE RESPONSIBLE PERSON

Address SOPs to a primary user who is the "actor" or the person performing the action. It is not necessary to say "The Chemistry Technician shall…" or "the Lab Assistant will…" for every step, as long as the primary user is the actor. However if someone else performs a step, that actor must be identified.

PRINCIPLE 5: USE QUANTITATIVE INFORMATION

Specify quantitative rather than qualitative information whenever possible. Avoid vague terms such as "warm," "diluted," or "in a few minutes." Use standard units of measures and use them consistently. If you use oF, stick with oF. Express quantitative information such as ranges, limits, rates, or authorization levels in a way so that users do not need to judge accuracy. For example:

Poor: Maintain room temperature at 72 °F ±5

Better: Maintain room temperature 67 °F to 77 °F or Maintain room temperature at 72 °F ±5 (67 °F and 77 °F)

Ok, so there are the first five principles. Are you applying these principles in your SOPs? Next time we'll look at the other five.

Norm Moreau *is a consultant and trainer known for developing SOPs and implementing SOP programs that demonstrate GLP/GMP and nuclear QA compliance. His products and services are used to achieve ISO 9001 registration and ISO 17025 accreditation or by organizations that simply want to improve their operational efficiency and effectiveness. Since 2000, Norm has been offering the Writing SOPs that Work workshop at the National Meetings of the American Association for Laboratory Animal Science (AALAS). He welcomes comments, questions, even criticisms and can be reached at nmoreau@theseuspro.com.*

5 The Five Reasons for a Meeting

1. *Give Information*
2. *Get Information*
3. *Develop Options*
4. *Make Decisions*
5. *Warm magical human contact*

(excerpted from The Five Reasons for a Meeting by David Allen www.linkageinc.com/company/news_events/ link_learn_enewsletter/archive/2007/Five_Reasons_for_a_Meeting.pdf)

Glenn Ketcham, CIH and Vince McLeod, CIH

LEED the Way to Green

U.S. Green Building Council's path to better buildings

Green buildings and sustainability are getting a lot of media attention lately. As the debates on climate change, energy, and protecting the environment heat up, building green is gaining more and more momentum. So, what does this mean for the laboratory or facility manager? And, how are green buildings built? This issue's column will give you a brief overview of LEED, planting the seed for your next green building project.

WHAT IS LEED AND WHERE DID IT COME FROM?

LEED is the United States Green Building Council's acronym for Leadership in Energy and Environmental Design. Founded in 1993, the USGBC is a non-profit community of leaders representing more than 11,000 organizations from every sector of the building industry working to change the way buildings are designed, built, and operated.[1] The mission of USGBC is to move the building industry to environmental responsibility and sustainability. First launched in 1999, the purpose of LEED and the idea behind green building is to encourage design and construction practices that meet specific standards and minimize or eliminate the negative impacts of buildings on their occupants and the environment. Today, LEED is the nationally recognized rating system for design, construction and operation of high performance green buildings.

The LEED certification system is a voluntary, consensus-based standard, based on scientific principles and emphasizing state-of-the-art strategies. The initial LEED rating system, developed for new commercial construction and major renovation projects, is referred to as LEED-NC. There are also LEED rating systems for existing buildings, commercial interiors, homes (in pilot), schools, and others. LEED rating systems for healthcare and laboratories are under development. These LEED rating systems promote a whole-building approach to sustainability by addressing the complete building lifecycle and measuring performance in six key areas:

- Sustainable site development
- Water savings
- Energy efficiency
- Materials selection
- Indoor environmental quality
- Innovation and design1

WHY BOTHER WITH LEED

According to the USGBC, buildings worldwide account for 17% of freshwater use, up to 25% of the wood harvest, 33% of greenhouse gas (carbon dioxide) emissions, and 40% of material and energy use. By building green and obtaining LEED certification, you can realize up to 30% energy savings, 35% reduction of CO_2 emissions, 30 to 50% water use reductions, and 50 to 90% waste cost savings. In addition, benefits of decreased operating costs, increased property values, increased productivity, reduced

absenteeism, improved risk management, and verified building performance are seen with LEED certified buildings. And the additional construction costs for LEED certification is only 1 to 7%.[2]

THE LEED RATING SYSTEM

LEED certification is achieved by first registering the project with USGBC under the appropriate rating system. The project is then rewarded points in each of the six key areas by satisfying requirements of the respective section. There are a total of 69 points available. Based on the point total, i.e. the extent to which green building features are incorporated, the building attains one of the four levels of certification. For LEED-NC the certifications are:

- LEED Certified: 26 to 32 points
- LEED Silver: 33 to 38 points
- LEED Gold: 39 to 51 points
- LEED Platinum: 52 to 69 points.

The point breakdown and main credits for each of the six key areas are as follows:

- Sustainable site development (14 points) — addresses construction activity pollution prevention, alternative transportation strategies, storm water control and other items
- Water efficiency (5 points) — credits innovative wastewater technologies, water efficient landscaping, and water use reduction
- Energy and Atmosphere (17 points) — provides for commissioning of the building energy systems, refrigerant management, and optimized energy performance including on-site renewable energy
- Materials and Resources (13 points) — deals with collection of recyclables, material reuse, construction waste management, and use of recycled, regional and renewable materials
- Indoor Environmental Quality (15 points) — covers indoor air quality and ventilation performance, use of low-emitting materials, indoor pollutant source control including environmental tobacco smoke, temperature, and lighting systems
- Innovation and Design Process (5 points) — intends to provide building occupants a connection between indoor spaces and the outdoors by maximizing day lighting and viewing opportunities.

SUMMARY

We have provided a brief introduction to building green, the U.S. Green Building Council and their Leadership in Energy and Environmental Design certification rating systems using the LEED for New Construction as the model. The other LEED rating systems for commercial interiors, existing buildings, schools, etc. contain the same six key areas but may vary in the points or credits for each and thus have slightly different point totals for the four LEED certification levels.

No matter which rating system you are working under, most of the key areas will have prerequisites that must be satisfied. For LEED-NC these include construction pollution prevention under Sustainable Sites; commissioning, energy performance and refrigerant management under Energy and Atmosphere; storage and collection of recyclables under Materials and Resources; and indoor air quality performance and environmental tobacco smoke control under the Indoor Environmental Quality section. So, obtaining LEED certification is a serious commitment. However, obtaining it is worth the effort. The small increase in construction costs provides large benefits for the environment, the planet and most of all the building occupants.

Keep watching the Safety Guys column for future articles on LEED for laboratories and health and safety issues for green building and LEED. Until next time, Safety First!

References

1. United States Green Building Council. Washington, D.C. 2007. http://www.usgbc.org/
2. United States Green Building Council, LEED Resources. Washington, D.C. 2007. http://www.usgbc.org/DisplayPage.aspx?CMSPageID=75&

Glenn Ketcham *is a Certified Industrial Hygienist with 22 years experience in the health and safety field. He is currently the Risk Manager for the University of Florida with responsibility for the loss prevention, ergonomics, disaster preparedness, and the occupational medicine surveillance programs. He has managed the laboratory safety programs for both the University of California, San Diego (UCSD) and the University of Florida. In addition, he served as an industrial hygienist with federal OSHA compliance and has a masters degree in environmental engineering sciences with a health physics concentration.*

Vince McLeod *is a Certified Industrial Hygienist and the senior IH with the University of Florida's Environmental Health and Safety Division. He has 17 years of occupational health and safety experience in academic research with focus in the research laboratory. His specialties are in hazard evaluation and exposure assessments.*

The Safety Guys welcome your comments and questions. You can email them at thesafetyguys@labmanager.com.

Recruiting, Managing and Developing Talent in the Lab

If you're looking to develop, assess, and expand your own leadership skills but couldn't attend Lab Manager's recent Boot Camp in the Boston area, know that you missed a unique opportunity to get immersed in all aspects of management. And trust here that I'll share a bit of what you missed.

For starters, let me say that as someone who attends a lot of conferences each year, I've come to score the value of each one I attend based on the number of new lessons I gleaned from the event speakers, fellow delegates, and yes, even the occasional exhibitor. Considering these metrics, it was definitely time well spent.

I hope it was also worthwhile for the lab managers who attended my presentation exploring best practices in recruiting, managing, and developing exceptional management-level talent. And since you may have missed it, let me highlight some of the lessons I've learned about tackling those challenges — each of them also supported by my own experiences:

1. Understand that organizational culture sets the table for senior-management recruiting If your lab doesn't enjoy a collaborative culture, great talent and superb executive leadership, chances are it's not going to be able to attract a consistently high caliber of management-level candidates. In today's labor market, the most accomplished managers have a fair number of career options, and if your culture doesn't appeal to them, they'll look elsewhere. And it's important to remember that organizational culture doesn't only preordain whom your lab can and can't attract, but it is also very much a driver of team performance and overall employee morale, productivity, and engagement.

2. Always look for an internal successor/hire before you search outside for new talent. Unless you're looking to disrupt an underachieving culture or otherwise change your organization's strategy, your organization should always look to internal promotion before considering any external search for new talent. For far too many companies, searching outside for new management candidates has become a knee-jerk reaction, a first impulse and a costly avoidance of promising leaders who are already part of your workforce. The external search for new talent — at any level — should really only be pursued once you've exhausted your options for internal promotion.

3. Reinvent the candidate experience. How are candidates for positions in your organization treated throughout the recruiting, interviewing, and hiring process? Are they always granted a measure of respect? Are they told where they stand in the process? And, more importantly from an employment brand and workforce culture perspective, are candidates who weren't ultimately offered a job appropriately contacted to make them aware they're no longer in the running? Don't leave job applicants hanging in the wind. The very best employers know how that can impair their image and their ability to recruit in the future.

4.Commit to onboarding. If your organization isn't committed to ensuring the smoothest possible transition for a manager in a new role (whether they were

Joseph Daniel McCool

promoted or recruited into it), it is risking its investment in human capital. The sink or swim approach no longer serves the best interests of the lab, the individual manager, nor the interests of the recruiter who may lured the person to the promise of new career opportunity. Giving new managers some feedback about their early performance in a new role gives them a chance to correct any missteps before they become fatal flaws.

What It Means For Your Career: These best practices to recruit, develop and grow lab managers and others within your organization are being embraced by organizations with an eye toward future growth, the creation or perpetuation of outstanding workplace culture, and a genuine commitment to their people. If you're not part of an organization that realizes the benefits of these practices, speak up and promote them. Otherwise, you'll only have yourself to blame if you eventually find yourself in the middle of an under-performing culture with middle of the road management.

Joseph Daniel McCool *is a writer, speaker and independent consultant on workforce management, recruiting best practices, and corporate management succession. He is the author of a forthcoming book about global executive recruitment and its impact on corporate performance, culture and profits and will be a featured presenter at Lab Manager's October 25 Boot Camp. He is also a senior contributing editor with ExecuNet, a leading executive business, recruiting and referral network, and his perspectives on recruiting best practices have been cited in BusinessWeek, The Economist, The Financial Times, The Wall Street Journal and other media around the world. Contact him at JoeMcCool@comcast.net.*

Think writing job descriptions are a waste of time or give employees an opportunity to refuse to do tasks that are not spelled out in black and white?

If you are uncertain about the value of job descriptions, About.com offers a few good reasons why it's worth the time to create job descriptions. These include:

- *Job descriptions provide an opportunity to clearly communicate your company direction and they tell the employee where he or she fits inside of the big picture.*
- *Job descriptions set clear expectations for what you expect from people.*
- *Job descriptions help you cover all your legal bases.*
- *Whether you're recruiting new employees or posting jobs for internal applicants, job descriptions tell the candidate exactly what you want in your selected person.*
- *Well-written job descriptions help organization employees, who must work with the person hired, understand the boundaries of the person's responsibilities.*

For more tips on writing job descriptions that work, go to humanresources.about.com/od/glossaryj/a/jobdescriptions.htm .

Virginia Espina, MS, MT(ASCP)
Research Assistant Professor
George Mason University

On a good day, Virginia Espina connects a few more dots.

Such is progress in translational research labs, where trailblazers like Espina explore the great divide separating molecular and clinical science, tricky terrain littered with roads not taken, bridges to nowhere, and regulatory bottlenecks that stymie the development of novel therapeutic strategies.

With so many possible pathways from bench to bedside, and so few roadmaps, promising ideas are too often waylaid crossing the boundaries of the research spectrum — lost in translation, as it were.

So it falls to experienced clinical scientists like Espina, who principally possess the knowledge to work all sides of the equation, to carve out the steps that transform basic science and patient observations into clinical application.

"None of my predictions imagining how my career would go ever came true," said Espina. "But I have to say I'm very happy. All my experiences built on one another to give me the wisdom to do this job."

Her father was a chemical engineer who left materials "in the back yard over the weekend in Styrofoam containers….I was always fascinated by what was inside those boxes." Between that and her brother's chemistry set, she "grew up always knowing I wanted to wear a lab coat." As her laboratory career at different hospitals evolved, Espina obtained an MS in biotechnology from Johns Hopkins University to solidify her scientific credentials.

The operative word in translational research is creative, and that's where Espina is in her element. She felt constrained by heavily regulated hospital operations "to get reproducible results from patient to patient and sample and sample," and had difficulty suppressing her creative itch.

"I would always have questions," she laughs, recalling her hospital habit of asking "What if we did it this way?"

"I didn't really think I was making a difference. It seemed I was managing the same types of issues that every manager before me had dealt with."

In 2002, a friend introduced her to Larry Liotta at NIH, principal investigator and chief of the National Cancer Institute's Laboratory of Pathology, who offered her a dual position as lab manager and proteomal translational researcher. "I told him I'd be there in a heartbeat."

After Liotta was recruited by George Mason University in 2005, Espina followed, where she is now research assistant professor and lab manager at the university's Center for Applied Proteomics and Molecular Medicine in Manassas, VA. She marvels at Liotta's ability to think positively and connect sundry research and experiential threads, calling him "the best mentor I've ever had."

The yin and yang of combining research and management "suits me well. There is always a balance between the two, and it allows me take creative risks I wouldn't otherwise." One such "essential" need for creativity is "devising simple methods for complicated technologies" that the medical community will embrace.

Her lab is a freewheeling operation; Espina lays the groundwork and encourages staff to "take ownership" of projects to drive "better outcomes and more productivity." In contrast to a hierarchical hospital structure where staff is managed "based on (their) degree," she and Liotta embolden the lab's cast so that all can play a role.

Just as Espina draws upon her wealth of knowledge as a translational scientist, she banks on her full roster of experiences to manage her lab. "Most of the tools a manager needs are actually personality traits, with a little help from the Boy Scout den mother's handbook," said the mother

F. Key Kidder

of three who relies on her emotional intelligence to interpret speech patterns and body language for non-verbal cues.

She was inadvertently introduced to learning style differences while helping her son slog through his math homework. "Needless to say, I started researching learning styles and practicing on my colleagues." Management "is analogous to learning styles. Maybe we should be asking employees 'How do you like to be managed?' " Another "manager's trick" is determining what bonding mechanisms work best for any particular group; Espina likes to share edibles her staff collects on their travels.

A 2006 report by the Government Accountability Office identified the shortage of translational researchers as the missing link in America's health care enterprise, but Espina is not so dour, calling it a "prime opportunity" to cross-train more clinicians and scientists, and for pharmaceutical firms to partner with academic research labs to drive innovation.

"I foresee a future in which translational research is driven by the patient, almost a grassroots type of patient advocacy in which patients, armed with medical literature and popular media, will be recruiting both academic researchers and community medical staff for help in treating their disease, based on their molecular profile, and the economics of treatment costs."

Francis Key Kidder *started out as a journalist before moving on to politics and government relations, where he still keeps his hand in writing. He may be reached at 410-828-6529; info@labmanager.com.*

Don't Play the Micromanagement Game

The slogan of the micromanager is, "If you want something done right, do it yourself." However, "micromanagement stifles initiative and kills motivation," according to a very successful manager, World War II General George S. Patton. Despite this, many of us have worked for micromanagers and some of us have even been micromanagers. Why do people micromanage? How can micromanagers change their ways?

RATIONALE FOR MICROMANAGEMENT

People micromanage because they are insecure. This insecurity may arise for three reasons. First, people may be uncertain of their ability to be a manager and leader but confident of their abilities as problem solvers. This is often the reason new managers promoted from lab bench positions micromanage. More comfortable when in the problem-solving mode, they often move in on their subordinates' responsibilities to solve their problems for them. The second reason is that micromanagers may feel uncomfortable delegating authority and worry they'll lose control and power. Third, micromanagers often are ambitious and want to achieve superior results. So they want to be sure their staff members don't make any mistakes that could make the manager look bad. This lack of trust leads micromanager to closely monitor and control their staff members' activities.

STAFF EMPOWERMENT

Micromanagement is the opposite of staff empowerment. Why? Because in helping your subordinates solve their problems by doing it yourself you robs them of independence and makes them feel powerless. They become dependent upon you to solve their problems for them and fear criticism if they proceed on their own.

Allowing staff members to develop their own strategies to achieve their job goals does not mean lowering your own standards and abandoning your responsibilities. Work with staff members to assure that their strategies are consistent with corporate limitations such as research budgets for new equipment and capitalize on other staff members' knowledge and capabilities.

Coaching employees is different than micromanaging them. Help staff members gain the skills they need to meet their job responsibilities. Encourage them to be problem solvers who come to you when they do need help but only do so after making reasonable efforts to solve problems on their own. When they do need your help, coach, don't instruct. An example of this is an interesting scene in the movie, "The Hunt for Red October." Hero Jack Ryan is flown out to an aircraft carrier in preparation to capture the submarine, Red October, and explains his mission to the admiral. With the admiral's first questions, it becomes clear that Ryan doesn't have any clear ideas about how to accomplish his mission. Rather than issuing orders, the admiral shifts to a coaching mode that forced Ryan to think through his mission and develop his own plan.

I've seen this scene used as a coaching example in two different management courses. Because he developed the plan himself with the admiral's coaching rather than having the admiral plan his work for him, Ryan was more committed to its success and willing to do more to achieve this success.

As manager, focus on goals and allow your staff members a major role in determining how to meet these goals. Your primary roles as lab manager are goal setting and allocation of resources, including staff members' time, to achieve these goals. Another responsibility is setting performance standards. Diane Tracy, author of "10 Steps to Empowerment: A Common-sense Guide to Managing People" (William Morrow and Company, New York, NY), observed, "When asked to stretch beyond their self-imposed limits, people discover powers they never knew they had. A manager has more power to achieve his own objectives when the people who work for him work to their full capacity." People won't do this for a micromanager.

THE SECRETS OF DELEGATION

Staff members need to understand that, while being given independence and authority, they are now responsible for achieving their goals and meeting mutually agreed-upon deadlines in doing so. Mutual agreement upon deadlines, organizing work to be performed by teams, and setting project milestones are

John K. Borchardt

all ways managers can maintain control while empowering employees.

When empowering their staff members by delegating independence and authority, managers must follow up to determine how well the staffers are performing and whether goals are being met. They must effectively communicate this information to staff members. People need to understand how to improve their performance to meet the manager's performance standards. When providing feedback, follow the dictum, "Praise in public, criticize in private."

WRAP-UP

Ask yourself the question, "While I'm micromanaging, who is doing my job?" Amazingly enough, managers often neglect their own job duties to take on the more comfortable responsibilities of solving their staff members' problems for them.

Avoiding micromanagement can improve your own morale, reduce your stress level, and increase your own contributions to your organization.

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"How would you describe my leadership? Great, greater or greatest?"

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