

# ForwardFocus

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Summer 2007

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Plus  
**Inaugural  
Gold Nuggets Tour**

Montana Manufacturing Center

University Technical Assistance Program

## Numbers Solve the Puzzle for Diversified Plastics CEO

By Deborah Nash, MMEC

### What's keeping you up at night?

For Brad Reid, President and CEO of Diversified Plastics Inc. in Missoula, the wide fluctuation in computer vs. physical inventory count for raw materials was the issue. It was recurring variation he couldn't quite put his finger on. A Six Sigma project guided by a Field Engineer from the Montana Manufacturing Extension Center is helping him sleep better – and brought about some unexpected financial benefits as well.

The company is a second generation family-owned business that engineers plastic parts and solutions for industrial and OEM (original equipment manufacturer) applications. Design assistance, fabrication, injection molding and urethane casting are key offerings. The business was started by Reid's father in 1976, purchased by Brad in 1999 and now operates in an expanded 25,000 square foot facility. The company employs 46 people.

Diversified Plastics uses enterprise software that has an inventory tracking component where data is entered by workers for materials used, scrap, and left-over material put back into inventory. Managers use the inventory data for costing decisions and accounting. Materials costs can vary from \$30 to \$3,000, so the impact of discrepancies can be huge. Variation persisted each time monthly physical inventory counts were compared to computer inventory data.

Because inventory is money, up to \$400,000 on-hand at various times at Diversified Plastics, monthly fluctua-

tions made it difficult to know from month to month how the business was really doing.

"I thought I knew where the problem was," Reid said. "In roundtable discussions, we [managers] shared opinions about it." But the fluctuations continued.



**Brad Reid, President & CEO, enthusiastic about the future at Diversified Plastics.**

### Affects Bottom Line

Unidentified fluctuations in inventory may drive business behaviors that negatively impact the bottom line, according to Kreg Worrest, a Field Engineer from the Montana Manufacturing Extension Center (MMEC). When you're not sure what materials are really on the shelf, all areas of the business can be af-

ected: sales, product costing, production planning, inventory holding, on-time delivery.

To avoid some of these issues, many companies carry extra inventory. Reduced cash flow, extra storage needs, more danger of obsolescence and the added expense of flying in emergency stock can result. It ties up working capital, and if a company uses a line of credit to stock extra inventory, additional costs are incurred from paying unnecessary interest.

Escalating frustration finally triggered the inventory variance reduction project with Worrest serving as project lead and Six Sigma Coach. Reid considers Worrest a business coach and has used MMEC services in the past.

"I like his methods. You cannot deny numbers," Reid said. "You think you're probably right; but with data you can show, not just say, things are a certain way.

"I was not sure how to put a dollar value on controlling inventory in this way, but every month my comptroller was telling me inventory numbers were off, continually off. I just wanted to get the counts accurate and have better control of monthly accounting to see if we were making a profit."

He acknowledges that there were times during the 16 month project that he wasn't sure the time and energy invested were worth it; but morale is much better, the company is carrying less inventory, and it is benefiting in other ways.

### Six Sigma Controls Variation

Six Sigma is a quality methodology

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## Now is the Time for Action

**Good News!** Manufacturing in Montana continues to outperform national trends. The annual Kauffman Report confirms that Montana leads the nation with a whopping 600 business entrepreneurs per 100,000 people. Compare that to neighboring states like Idaho with 370 per 100,000, Oregon with 380, and even California with 350. The report confirms what we already knew: Montanans are creative, innovative and independent!



More good news in the mid-year economic outlook presented by Paul Polzin from the Bureau of Business and Economic Research at the University of Montana. He noted manufacturing played a major role in Montana's continued economic growth, along with mining and agriculture.

- Mid-year forecast for economic growth up from 4.3 to 4.9%;
  - Manufacturing sector growth, except wood-products sector, continues to outpace the nation;
  - Manufacturing labor income gains (wages, salaries, & fringe benefits) are up 4 to 7 percent, outperforming the national trends;
  - Energy and metal markets continued strong.
- As with all good news, some caution-

**Low unemployment rates and global competition demand an immediate response.**

ary notes: Montana unemployment showed a sixth straight month at less than 3 percent, and in some counties an alarming 1.5 percent. Polzin noted that he cannot recall numbers being this low in 40 years of analyzing the Montana economy. The problem of finding skilled, well-trained workers also continues. And low unemployment increases the challenge of attracting and keeping good employees.

Now is not the time to put your head in the sand. Low unemployment rates and global competition demand an

immediate response. Improving productivity by using new technologies and investing in automation and workforce development are in order. Implementing process improvements like Lean Manufacturing can go a long way toward increasing productivity even in the smallest shops.

**Seeing is believing!** MMEC is planning a Manufacturing Excellence Gold Nuggets Tour and Symposium to Grand Rapids, Michigan in December. This is a notable opportunity for you to travel with automation expert George Keremedjiev, MMEC manufacturing experts and your peers to see and discuss the powerful transformation that has taken place in several manufacturing firms. These companies started small, some in a garage, and through stages of improvement have become automated, mistake-proof, highly efficient Lean plants that export products throughout the world. Please consider joining us. See the back page of this issue.

MMEC offers a variety of targeted training tied to improvement projects including quality awareness, financial modeling, and a Lean Manufacturing workshop and simulation guaranteed to open your eyes to waste in your operation and methods for improvement. We are just one resource for worker training. Good things are happening across the state.

Our colleges of technology (COT) are working to respond to industrial training needs with expanded facilities and partnering with private sector companies for access to state-of-the-art machines. Both COTs and community colleges offer a wider variety of computer and programming skills, certifications, etc. Grants for new worker training are also available from the Montana Department of Commerce.

The state legislature also recognized the urgency and value of training for small companies, including manufacturing, in an action this spring. It reduced the requirement from ten new workers to one for a Department of Commerce administered workforce training grant program. This target is far more reason-

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# Assets and IP – Pay Heed to Improvements and Concepts That Slipped Attention

By Marti Elder, Guest Writer

Intellectual property is a term that is often misunderstood, or used synonymously with patents. Be very clear that your intellectual property (IP) runs far more deeply than having a patent portfolio. A first question for every business owner to consider is whether you have a clear understanding of your IP assets. If so, the next question is whether you have engineered a suitable strategy to get the maximum value from those assets.

For a company to inventory its IP assets, the process needs to be conducted interactively with all key personnel. The patent portion of this portfolio can be easily reviewed, but a closer look is needed to identify other patentable improvements and concepts that have slipped attention. These can take many forms – perhaps an innovation that moved beyond the boundaries of the original patent; or a tool devised and pressed into service by your shop; or a method of manufacturing developed to handle a troublesome material. The IP asset survey team will need to interact with all personnel to capture a true overview of patentable company inventions.

## Include These Things

The survey also needs to include non-patentable IP. These may include copyrights on the company website, publications and product literature. Representations of your logos or product names can be vulnerable without trademark filings; and the value represented in a company name should be considered for a service mark. All of the federal and state IP registrations weave together to preserve your company's separation from the competition.

Once the survey process is completed, each element can be examined to determine if your IP asset value is appropriately protected and optimally deployed. This level of ongoing diligence



Marti Elder

also is important to prevent inadvertent infringement on IP registrations and ownership by others. Under close review, you will find that not every IP asset deserves legal registration. The patent and trademark costs can be steep and are not always validated by the commercial strategy being pursued.

## Protection Options

Accordingly, companies need to examine other options for protection. SBIR companies may choose to rely on federal contract data rights, and consumer product manufacturers may want to focus on creating legal distinctiveness through the unique visual appearance of their product or packaging. All innovators need to consider whether their IP can be better protected as a trade secret, rather than making it public through the patent process. This must not be confused with a passive, “do-nothing” decision. The company will need to instigate a policy of secrecy that includes use of employee confidentiality agreements.

## Reveal Under-Deployed Assets

Finally, the survey process can reveal under-deployed IP assets. An evaluation is needed to determine whether patents or patentable inventions should be licensed out or abandoned. Many Fortune 100 corporations have strategies for out-

## Think About It:

“U.S. firms leave \$1 trillion on the table every year by under-using their intellectual property, according to the Harvard Business Review.”

– *Industry Week*, July 11, 2007

licensing their standard-setting IP to competitors. This can create an element of market control not possible if the IP is hidden away in-house. There also is potential for a revenue stream from innovation that doesn't have deployment value inside the company. An assessment process can determine whether that potential revenue will justify an out-licensing effort.

Looking at the bottom line, a smart company should be as fully in tune with its IP assets as with its capital assets. Through good survey and analysis, you can integrate the IP value into the company growth strategy, and effectively protect those assets to serve future needs.

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## Diversified Plastics (continued from cover)

for controlling variation in processes. It breaks complex problems into component parts and helps identify root causes that, in turn, help with solutions. A basic Six Sigma premise is that processes can be measured, analyzed, improved and controlled.

To understand and improve the processes affecting inventory at Diversified Plastics, Worrest first mapped process flows and inventory tracking activities. In an effort to improve physical inventory count he used a Six Sigma technique to rank employees on proficiency with inventory count to be sure people with the appropriate skills were performing those tasks. And he developed procedures to collect and report data (check sheets, pareto charts, box plots, p-charting etc.) to better see and analyze what was happening.

Standard work methods, visual controls and 5-S (sort, set in order, shine, standardize, and sustain) from the suite of Lean Manufacturing techniques also helped set up better inventory control into the future.

Visual tools were used to help identify inventory problems, the amount of variation and frequency of occurrence. The charts and process maps helped workers understand where the system was broken and how they could help to improve it, according to Rich Hoffman, Diversified's Inventory Control Manager.

"Having the proper data in the computer affects everybody: Sales, price quotes, production, and customers," he said.

Tapping a folder of documents, he added that the best thing from the project was a set of procedures Kreg put together. "It has everything for planning, learning and doing inventory control. Whether it's me using it or the next inventory control manager that steps in, everything is here."

### Analysis and Visual Tools

A step-by-step inventory process map and sampling of errors related to inventory helped to analyze root causes. Errors were listed and recorded on each process using a system of numeric, color-coded

dots to represent error types. The map showed how material moves through the plant; the dots indicated which error(s) occur at a given location. With analysis, appropriate solutions for each process could be defined and work methods standardized.

"Not every process has the same problem; not every problem has the same solution," Worrest said. Once the real problem is identified, the correct solution for a specific process can be applied.

"We used this map coupled with a check sheet and Pareto chart to help determine which errors were causing the most problems," Worrest explained. That helped prioritize corrective actions for such things as incorrect reporting of actual material used, work orders closed too late to capture the data, or material simply not able to be located. Some of these errors had been carrying forward into future monthly reports.

### Charting

A run chart was another data analysis technique used to help identify where most variance was occurring. Worrest used it to gather and track first pass count accuracy for categories of raw material with monthly data on the horizontal axis and dollar variance on the vertical axis.

What popped to the top was variations in sheet stock [see Figure 1], some of which can be very pricey. Information from the run chart can be a key indicator in gaining control of inventory. Worrest then applied a Six Sigma "significance test" to confirm that the sheet stock variation was statistically different from other types of raw materials Diversified Plastics purchases. With the results confirmed, he advised the company to focus on sheet stock control, and it was the first item Hoffman tackled and continued tracking when he came on board in 2006 in mid-project.

By knowing exactly what problems occurred for materials at specific points in the inventory tracking process, the

company identified and implemented new ways to improve their inventory tracking. Later, a second significance test confirmed the effectiveness of the new methods used to reduce inventory variation.

### Positive Impacts Result

By the end of the project in early 2007, significant dollar impacts had been gained, corrective actions and controls had been put into place, and first pass inventory accuracy really stabilized. At project close:

- Achieved a \$40,000 reduction in inventory
- Reduced expedited freight charges by \$5,000
- Recovered lost production output of \$5,200 (by eliminating search for materials, investigating for discrepancies, etc.)

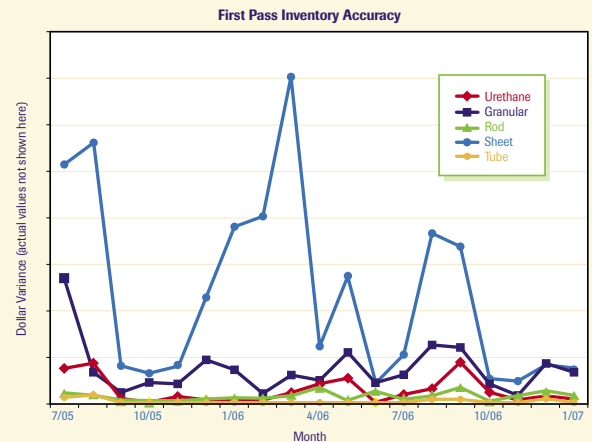


Fig. 1

Maintaining that focus has really paid off, Hoffman said, and work is continuing to sustain the progress the company has made. The project has helped in planning the work schedule. Sales can now work from inventory data without going to check the shelves before giving a quote, reducing the chance of losing a sale because the customer gets impatient waiting for a call back.

"We are now able to carry 10 percent less inventory because we know it's there. And there are no red label [air shipments] to meet delivery deadlines," Reid said, pleased that the project resulted in real cost savings.

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## First WIRED Academy Showcases MSU-Northern; Biodiesel Pioneers

By August Uhl, MMEC

Approximately 75 people from industry, agriculture, workforce development, education and government gathered for the first Montana WIRED Academy at the Applied Technology Center at Montana State University-Northern in Havre on Aug 14-16.

Attendees witnessed, first hand, the capabilities of state-of-the-art engine and chassis performance and the diagnostics lab at MSU - Northern's College of Technical Sciences. The rumble of hundreds of horsepower was felt even through the explosion-proof wall and bullet-proof glass.

The University offers many services that will be vital in the promotion of a bio fuels industry in Central and Eastern Montana. The planned addition of ASTM testing capabilities to the lab at the Applied Technology Center will add to these services and eliminate the need for local producers of bio fuels and lubricants to send samples out of Montana for testing.

The event was also an opportunity for those interested or involved in the WIRED Agro-Energy program to meet and discuss the opportunities and challenges faced in the 32-county WIRED region and hear a diverse group of presenters and panel members.

### Montana Agro-Energy Plan

Inside Hensler auditorium, two large banners depicted a field of grain and a friendly farmer, relaxed for a moment in front of a barn. The banners read "Montana Agro Energy Plan." This title is part of the WIRED effort to create a regional identity and also to better convey the meaning of WIRED (Workforce Innovation and Regional Economic Development) for the state.

The focus of the WIRED program in Montana is to act as a transformational initiative to help achieve several goals: development of a world class bio products industry; development of a highly trained and stable workforce to support bio products and other value-added agricultural products; creation of an agile, integrated talent development system (workforce,

education, and talent development), and creation of an inclusive and sustainable regional identity.

### Young Biodiesel Pioneers

If America's youth are the key to our future, one presentation demonstrated the potential that they and bio fuels hold for Montana and America. During the conference, four young men, students and recent graduates of Billing's Skyview High School, shared their experiences as part of an after-school biodiesel team. The students were from Mr. Fred Michels' chemistry class. They contributed much time and effort to not only experiment with making biodiesel from various feedstocks but also to successfully modify a donated Mercedes to run on biodiesel year round. Using before and after photos of the 1973 Mercedes, the group showed that just getting the car to run was, in itself, a feat of automobile restoration. The group successfully tackled the issue of modifying the vehicle to run on biodiesel, installing systems that allow the car to start on petroleum diesel and switch to running on biodiesel.



**Skyview High School Biodiesel team from left to right: Fred Michels, Charlie Ferguson, Logan Boespflug, Kevin Laborda, Alex Verploegen.**

During the project, the students needed to address multiple issues, solve problems, seek sponsors, obtain a donated vehicle and feedstock, and also create partnerships with the community and from local service providers. This small scale project was illustrative of the WIRED Montana Agro-Energy Plan that will also require many steps and the collaboration of many folks from all walks of life to make this transformational initiative happen for Central and Eastern Montana.

## Business Driving Prosperous Montana Economy

The Montana Chamber of Commerce applauded the recent announcement that total taxable valuation of assessed Montana properties has exceeded \$2 billion for the first time and the amount of newly taxable property has set a record of \$120 million. Business investment led record growth in newly taxable property with a 32% increase above 2006 levels.

"Montana business drives our economy, and we are proud that our companies continue to bring prosperity to Big Sky Country," said Webb Brown, President/CEO of the Montana Chamber. "Our task ahead is to ensure the business climate remains positive for continuing growth."

According to Montana Department of Revenue figures, statewide taxable values grew from \$1.95 billion in 2006 to \$2.06 billion in 2007. Business investment comprised 57% of the growth in property values. Business investment grew by \$68.1 million as compared to \$51.6 million in 2006.

"Strong growth in business equipment, electrical generation, and industrial property proves that our efforts to reduce the burden on businesses (through reductions in business equipment tax, for example) are encouraging the very economic expansion we said they would," Brown said. "Business activity has brought record surpluses in the state budget – now it's time to see some return to businesses through tax relief."

[www.montanachamber.com](http://www.montanachamber.com)

## Manufacturing News

### Rancher's Dream and Innovation a Reality

The highly advanced **Native Seedsters™ harvesting system**, developed by Montana rancher and inventor Lee Arbuckle, is now in production, meeting seed farmers' needs for an effective seed harvester of hard-to-harvest grassland plants. An intense five years R & D program, including field testing on a spectrum of difficult to harvest seed species in three states, prepared the Native Seedster™ for the market, according to the Native Seedsters, Inc. Web site ([www.nativeseedsters.com](http://www.nativeseedsters.com)). From the start, the design team strived for a simple, low maintenance, durable machine to mount on a common farm tractor of 80 hp or more.

### Belgrade Firm Earns Prized Accreditation

**Bacterin International, Inc.**, a biotech company and manufacturer of elutive bioactive coatings for medical devices, was recently awarded accreditation by the American Association of Tissue Banks, one of fewer than 100 companies worldwide to earn that standing. The company specializes in tissue grafting, transplantation technology, biofilms and anti-infective coatings. ([www.bacterin.com](http://www.bacterin.com))

### Teton Steel to Build Plant in Billings

Montana's first manufacturer dedicated to making rebar concrete reinforcement will open a plant in Billings at 812 Gable Road, near Roscoe Steel. **Teton Steel**, owned by Dalco Steel of Denver, Colo., has already been doing business in Montana, serving customers from its Wyoming plant. The Montana plant will be comprised primarily of a large steel yard with crane-ways, and two buildings – a 1,300 square-foot office building and a 30,000 square-foot maintenance shop. It is expected to employ up to 20 people with an October opening planned. (*Big Sky Business Journal Hot Sheet*, Aug. 13)

### Montana Ranks Highest for Entrepreneurship

According to the **Kauffman Index of Entrepreneurial Activity**, the only annual study to measure business start-up activity for the entire U.S. adult population at the individual owner level, Montana ranked as highest on rate of entrepreneurial activity with 600 entrepreneurs out of every 100,000 folks. That compares with 380 for every 100,000 in Oregon, 370 in neighboring Idaho, 350 in California, and 290 in Utah. The Index is a key component in and one of the 26 top indicators used in the Kauffman Foundation's highly recognized State New Economy Index. (<http://www.kauffman.org/items.cfm?itemID=861>)

### Montana Vehicle for Military in News

The "Squad Mission Support System," a military version of the Land Tamer vehicle manufactured at **PFM Manufacturing** ([www.landtamer.com](http://www.landtamer.com)), Townsend, is a featured video clip "Future Weapons SMSS" on the Discovery Channel Web site. The vehicle can carry the load of 10 soldiers – 1000 lbs of gear, can be remote controlled, weighs only 2000 lbs unloaded, and can be parachuted in to a site. See video clip at <http://dsc.discovery.com/beyond/player.html?bctid=643351258>

### Top Line Growth

"Though 6 of 10 firms are looking for ideas to cut costs, **8 of 10 firms need ideas for growing sales.**" – Doug Hall, *Eureka!Winning Ways* [Also keynote speaker for *Compete Smart 2008*]

### Natural Resource Market Strengthening Economies

A strong natural resource market is strengthening the Canadian dollar...and strengthening the market for goods manufactured in Montana. (*Big Sky Business Journal Hot Sheet*, June 18)

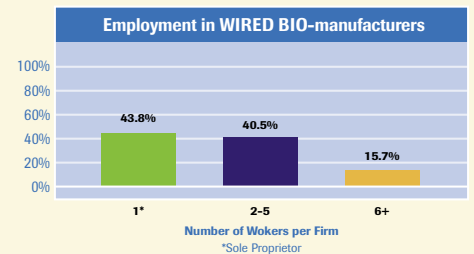
### Got Drivers?

You may need a driver policy on distractions. Each year, more than 42,000 people are killed and more than three million injured in more than six million motor vehicle crashes on the nation's roads. National Highway and Traffic Safety Administration estimates that **driver distraction is a contributing cause of 20-30 percent** of all motor vehicle crashes. One researcher estimated that driver inattention may cause as many as 10,000 deaths each year and approximately \$40 million in damages. ([www.digitaldriver.org](http://www.digitaldriver.org))

## Bio-Manufacturing—More Than You Might Think

A recent survey\* of manufacturing firms in Montana's WIRED (Workforce Innovation in Regional Economic Development) counties in central and eastern Montana reveals numbers that may surprise you.

Of 469 manufacturers located in these 32 counties, 338 were classified as bio-manufacturers in the survey conducted by the Bureau of Business and



**Nearly 85 percent of bio-manufacturers in the WIRED counties are sole proprietors or employ the proprietor and up to four additional workers. Only 15.7 percent employ the proprietor and five or more workers.**

Economic Research at the University of Montana for the Montana Manufacturing Extension Center. By definition, they take in raw materials, some or all of which are made of plant or animal-base, and process them by adding value before selling them. The survey count includes sole proprietors. (See chart of employment findings above)

Another interesting finding is that only three in ten respondents maintain a World-Wide Web site for their business. Those with more employees were more likely to have a site. Of sole proprietors, only 23% have Web sites compared to nearly half for companies with more than six workers.

To learn more about the survey and about the MMEC WIRED assistance project see "The Montana WIRED Manufacturers Survey – Final Report" posted as a .pdf on the MMEC Web site ([www.mtmanufacturingcenter.com/AboutUs/WIREDproject.htm](http://www.mtmanufacturingcenter.com/AboutUs/WIREDproject.htm))


\*The survey, which includes data on employee skills feedback and training need projections, was funded through a U.S. Department of Labor WIRED grant from the Montana Department of Commerce in conjunction with the Montana Department of Labor and Industry.

## Time for Action (continued from page 2)

able for Montana where more than half of manufacturers with employees have fewer than 5 workers.

Those of us from the baby boomer generation might do well to explore tips on attracting and retaining Generation Y (those born from 1982 – 1993). You might be surprised to learn that while they may not stay in one job throughout their lives, they are interested in career development and multiple experiences within an organization. Flexibility to meet the expectations of a younger worker might be a challenge in the manufacturing environment, but it might be the better road than high turnover. And an investment in upgrading skills of current workers gives them a sense of being valued. That can go a long way in retaining workers.

Don't let the good news lull you. Join us in Michigan; talk to one of our engineers about improving throughput; reward your valued employees...**Act now.**



Steve Holland, MMEC Director

## Diversified Plastics (continued from page 4)



**Kreg Worrest (right) hears about Diversified's latest acquisition, a Haitian injection molding machine with fully integrated computerized control system. It weighs in at 76,000 pounds with a 700-ton clamping force and can produce a part weighing over 7 lbs. It opens up opportunities in several key markets.**

With the project work in place, he said, the company can now respond to price changes appropriately for better product costing and quotes. "I can set commissions accurately; and if I find the product has a low margin, I can discuss it with the sales reps to reduce their margin on it; we can discuss it using data and not just gut feeling – it's a better ground for action."

"How we solve the big ticket items will have a ripple effect in solving some of the minor problems," Reid predicted. The next target will be a look at finished goods inventory where additional capital may be tied up.

## Congratulations to Diversified Plastics!

The Missoula firm just won the *Family Business of the Year* award in the 30-50 employee category for the upcoming Montana State University State Farm Insurance Family Business Program set for Sept. 21 at the Bozeman Holiday Inn. The annual event is hosted by the MSU College of Business, and this year includes an "Out of Service" business seminar and awards luncheon. Seven firms will receive awards underwritten by Stockman Bank. Winners receive a plaque, press coverage and recognition at the awards luncheon.

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*Best wishes to Chuck Keegan on his retirement as Director of Forest Industry Research at The University of Montana*

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# MMEC GOLD NUGGETS

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- Testing labs w/ technician dialogues
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*You are responsible for your own travel fare.*

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