

Culture of Accountability: Ventana Medical Systems

Robert W. Hall

Ventana's goal is to Find Cancer Early. Its ambition is to compress the test times and process footprints in its customers' laboratory operations. Consequently, lean thinking is a natural fit, not just in production, but throughout the company.

The market is histology laboratories examining tissue specimens. Most are pathology labs in hospitals, but histology labs are also fundamental in a great deal of biomedical research in universities and elsewhere. New ideas for customer lab operations are constantly being tried on-site, in the Lab of the Future. Ventana does not just sell test equipment and reagents. It promotes improved, more efficient operations for its customers. On-site classes of lab technicians are in constant session.

A customer service initiative called "Listen to the Boss" keeps up a daily dialog with lab technicians everywhere; listening to complaints about Ventana equipment or reagents (no one escapes a few of these); asking advice; posing problems. To work these customer lines, one has to be an experienced expert in histology and Ventana products, but everyone takes regular turns listening to these conversations. All senior executives take a turn participating in these calls. Keeps them alert, abreast, on their toes — and humble.

Fast-Moving Technology

Lean thinking guides development of Ventana technology. Whether done consciously or unconsciously, it may also guide initiatives from competitors and elsewhere that threaten to make even Ventana's latest offering, SYMPHONY®, obsolete. This field moves fast.

Ventana is only one runner in the race to improve the quality of life, the earliest precursors of abnormal cellular growth that can be used for targeted intervention. Today's state-of-the-art, targeted intervention consists of finding the correct combination of chemical inhibitors of malignant cellular growth with minimal side effects and on a small scale — without infusing toxic agents in concentrations that make hair fall out, and worse, disrupt essential

In Brief

Ventana Medical Systems is AME's Best Company Winner for 2007. Lean thinking is evident throughout the company, even in the approach to the customer and in R&D. The behavioral foundation of lean within Ventana is its Culture of Accountability, to which everyone must commit. It has been carefully developed. Leadership practices sustain both the culture and operational progress with lean thinking.

About Ventana Medical Systems

In Spanish, Ventana means "window," implying that Ventana provides a window into the workings of that basic unit of life, the cell. The company is dedicated to revolutionizing histology, which is anatomical pathology to most of us. Not many years ago lab workers analyzed human tissue (and animal tissue in some cases) using microscopes, stains, and using long experience, stared at enlarged samples on a glass plate, looking for anomalies that suggested abnormal growth; cancerous in most instances. Ventana's ambition is to convert that 1' x 3' glass plate into a full-range laboratory, with more information in less time and eliminating - horrors - all those false readings and re-starts.

A manual procedure for tissue analysis can have as many as 150 steps and take days. Using Ventana automated equipment and reagents, a test that once took three days now takes four hours with much less chance of an erroneous reading. That's still too slow for anyone whose life is in the balance awaiting test results. Ventana is working to cut that as soon as possible. The official mission of the company is: Provide innovations in science and medicine that improve the quality of life. No one fails to be inspired by the current goal of that mission, to find cancer early.

Ventana's headquarters and plant are near Tucson, AZ. It thrives on innovation and technology. Of nearly 1,100 employees, many not on-site, over 200 are research & development personnel dedicated to the mission. Much of its 182,000 square feet is devoted to research and engineering. Only 80,000 square feet are consumed by production. Within a year Ventana expects to expand to 350,000 square feet, but their confidence in their lean strategy is so high that the production area will not expand at all while absorbing volume increases of about twenty percent per year. Over 70% of sales are in North America; about 20% in Europe; and the company is beginning to get a toehold in the Asian market.

The company markets automated instruments, reagents, diagnostic aids, and consultation on a variety of histology lab problems, from novel biomarkers to improving their flow of work. With about 3000 standard end items, the manufacturing operations are high-mix, low-volume, and high-tech, with new additions to the product line constantly. The latest instrument introduced is SYMPHONY®. It completely automates standard "hematoxylin-eosin" or "H&E" lab tests (80% of all lab work). It enables barcode tracking of samples, monitoring of reagents, and other features that extend information available from tests while reducing the work to obtain it. The total market in Ventana's field is expected to double within five years, so it is in an aggressive growth phase.

Ventana was founded more than twenty years ago by Dr. Thomas Grogan, who is still a professor of pathology at the University of Arizona. He spends about a day a week at Ventana, and is still actively proposing innovative ideas and helping to develop them. Mingling with employees, Dr. Grogan inspires all with his genuine concern for the plight of patients dependent on tissue analysis. He clarifies the link between everyone's work and the fate of patients nervously awaiting the results of lab tests, reinforcing the gravity of Ventana's mission to improve the quality of life.

Ventana is not a strictly functional high-tech place, but an artsy spot in a desert location. The "V" logo is subtly embedded in the architecture ("As" are upside down "Vs.") Aesthetics are promoted by a local ordinance specifying that an owner of any development must invest 1% of the land value in public art. In addition, Ventana employees are an unusually expressive group. For example, corridor passageways are lined with paintings, many of them painted by employee artists.

For Ventana's description of itself see: www.ventanamed.com

organ functioning. Ventana works with pharmaceutical companies to find the right sites and growth inhibitors for individually targeted cancer intervention, also known as Companion Diagnostics.

Further back in the precursor chain leading to cancer or other tumors is the expression of tumor-suppressing genes that when "switched off" allow uninhibited cell growth. If DNA tests detect that one's genes are running some pre-cancerous "red

lights," close monitoring can begin. It helps know where to look if researchers understand the trail from genetic activation to changes in the proteins that eventually produce abnormal cellular growth. Peeling this onion has barely begun, but it is promising.

That is, Ventana's research scientists have to stay abreast of a big, fast-growing biomedical field in order to be on top of the next breakthrough in finding cancer early. Lean thinking all through the company

helps researchers focus on finding technology to deliver practical results to their lab customers.

For example, Dr. Sandor Papp, Principal Scientist, is occasionally called to the production floor if an andon light goes red, and cell leaders suspect that a technical issue's roots are buried deeper than a shop floor fix. Papp notes that such calls are a learning experience for him too, but few companies have senior scientists responding to andon lights. To promote this at Ventana, each business unit (about the same as a value stream organization) has a direct link to its associated research personnel.

Dr. Papp adds that lean thinking also guides R&D. Many projects decrease the amount of reagent used while improving both quality and productivity in the customer's labs. His role is to apply leading-edge science to these "lean projects." Dr. Chis Woods' "lean project" example is helping pharmaceutical companies understand the effects of drugs on tissue in greater detail from histology tests, thus cutting time to check a drug for toxicity.

At Ventana, lean thinking is not confined to operations. They push the leading edge in research, which is why R&D is bigger than operations. The grand lean vision is to compare instantaneous test results with a global database and prescribe a targeted intervention unique to a specific individual. If you can dream it, maybe some day you can do it.

A Culture of Accountability

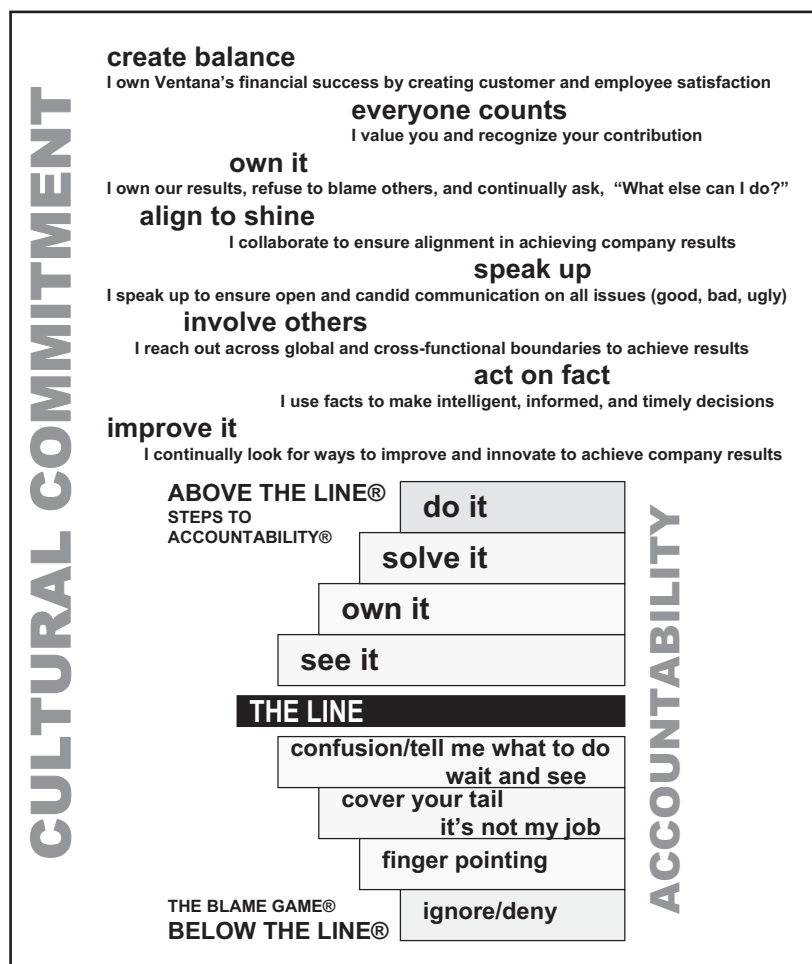
Lean thinking at Ventana concentrates on problem seeing and problem solving. Lean operations reveal a full complement of issues for everyone to address. But the foundation of doing this well is Ventana's Culture of Accountability, diagrammed in Figure 1.

This culture is taken seriously by everyone at Ventana. It's no mere set of platitudes on the wall. Everyone's performance review is fifty percent based on what they have accomplished. The other fifty percent is based on how they did it;

whether they exhibited the beliefs and behavior summarized in Figure 1.

The Culture of Accountability is reinforced in other ways too. Feedback on cultural commitment is part of every staff meeting. All production teams have end-of-day meetings. The culture may not be

The Culture of Accountability at Ventana



To make it easier to read, the diagram above is not identical to the one displayed in many places within Ventana, but it is close. The eight beliefs with sub-text explanations are listed at the top of the diagram. The bar diagram at the bottom summarizes the behavior expected if one is following the eight beliefs. It's easy to see whether a person is "above the line®" or "below the line®" in personal interchanges. ABOVE THE LINE®, BELOW THE LINE®, and STEPS TO ACCOUNTABILITY® are registered trademarks of Partners In Leadership, LLC.

Figure 1.

mentioned in every meeting; depends on what else is happening at the time, but it comes up at least twice a week. Managers like Randy Barbera, Director of Manufacturing Finance, make it a point to join in one of these meetings weekly, more often if possible. It is necessary to keep up with what is happening. This pattern extends to all staff meetings up to the CEO's staff meetings. There is no question about expectations.

At Ventana peer-to-peer recognition is not only encouraged, it is rewarded. The Star Award program was created to reinforce above and beyond performance amongst employees with emphasis on behaviors that show commitment to the company's Cultural Beliefs. As a formal reward employees receive a certificate of achievement and a free lunch on the company. Every quarter the Employee Activities Committee selects 2 to 3 recipients from the Star Awards distributed in the past three months and awards up to three Quarterly Star Awards. The recognition for this level of award is a certificate of achievement and a \$50 gift card. At the end of the year the Employee Activities Committee selects 1 Star Award from the Quarterly Awards as the Annual Star Award winner. The Annual Star Award recipient receives a glass trophy and a \$1,000 gift card.

This recognition program is very successful and popular. In 2007 so far over 80

employees have received Star Award recognition from their peers for exceptional performance that demonstrated commitment to Ventana's cultural beliefs. This level of recognition really shows how successful employees have been at capturing and embracing Ventana's Culture of Accountability. An example of a Cultural Commitment Star Award nomination by an employee is in Figure 2.

Another aspect of the Culture of Accountability is "Speak-Up" Boards located in every work area. Anyone, whether working in the area or not, can write a problem observed on a white board. Someone must take responsibility for resolving the problem, and that someone puts their name on the board. These boards are the real, scrawled thing, like the fragment of a board shown in Fig. 3 as an example. Each issue stays on the board until it is resolved to the satisfaction of the person who originally "spoke up" about it. Most issues are not matters that a kaizen session can fix; rather somebody has to do a little engineering, order some materials, put something together - that is, it's a project. Speak-Up Boards invite people to put their name and performance reputation on the line.

The development of the Culture of Accountability began with an off-site team meeting three years ago, and it has mushroomed ever since. The first phase was

A Peer-to-Peer Cultural Star Award Nomination

"Late afternoon, after arriving at a site and evaluating the instrument, Zeshan noticed an unexpected repair was needed; however, he did not have the part required for the repair. Instead of taking the instrument down and waiting for the part to arrive, Zeshan coordinated with Matt and Ron, who were at another site two hours away, to get the part. Even though it was late in the day, Matt and Ron immediately agreed to make the trip. Because of this, Zeshan was able to get the part and make the repair, and the site was never down."

From an anonymous nomination of Zeshan for a Star Award.

Figure 2.

called Cultural Transition. As a result of many discussions among many teams, eight beliefs emerged, as shown at the top of Figure 1, and they have been embellished with explanations from different perspectives ever since.

Ventana is now in the Cultural Commitment phase, emphasizing living the beliefs in actual behavior and practice every day. Following the "Above the Line" and "Below the Line" concepts, people now observe whether the meeting is going above the line, or diving below it.

The result of this three-year program is evident in the demeanor of Ventana personnel. A few people did not learn to behave according to the Culture of Accountability, constantly looking for reasons and excuses to go below the line, thus taking themselves out of the company. All the rest, however, began to approach kaizen and problem-solving more deeply, realizing that as individuals, they were only as good as their joint performance, and that every person's contribution is important to the whole.

Now hiring teams screen prospective employees partly based on the likelihood that they can accept the Culture of Commitment, which is not as easy as it sounds. After hiring, orientation thoroughly inculcates them in the mission and the culture; then departments begin to mentor them in "how we work and behave around here." This fits with a 2007 Ventana initiative called "Talent Management." Find very talented people. Find a spot for very talented people. Develop a plan for every talented person to further develop themselves. Coach these very talented people on how they can multiply their effectiveness by learning to embrace the culture.

Talented people can arrive at Ventana well-short of their potential. For example, Gilbert Valencia was the first person assigned to the Lean Systems Office when "lean" began.

Fortified with a working knowledge there, he became a group leader with two teams. Then he finished a four-year engineering degree. Now he is working with

the automation supplier to design equipment compatible with Ventana's lean manufacturing, but which scales up to the volumes of reagent that Ventana expects to sell in the next few years.

So what does the Culture Commitment do for Ventana — and for lean thinking there? According to Sandra Lueders in Human Resources, it is the foundation for a thinking culture that must balance its attention among the needs of at least four stakeholders: patients, customers, fellow employees, and investors. No one can juggle that conflict in every action taken, but it does provide a framework for honestly addressing what is most important when it is time to speak up on an issue. And of course, eliminating waste is an easy objective. It doesn't benefit any stakeholder.

Part of a Ventana Speak-Up Board

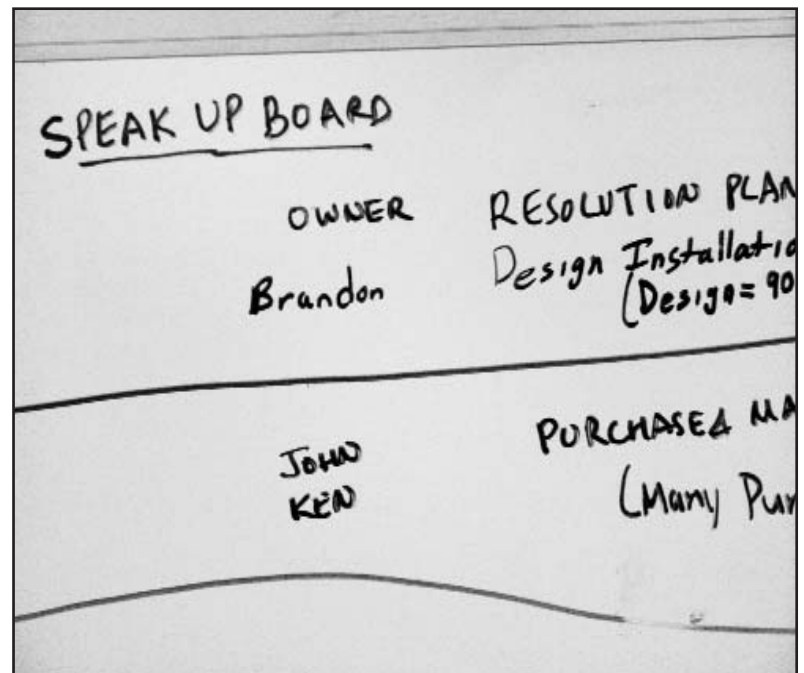


Figure 3. Speak-Up boards are part of Ventana's cultural impact on lean thinking. Not seen are the hand written headings across the top of the board: date; name; issue; owner (taking responsibility for resolution); resolution plan; and date closed.

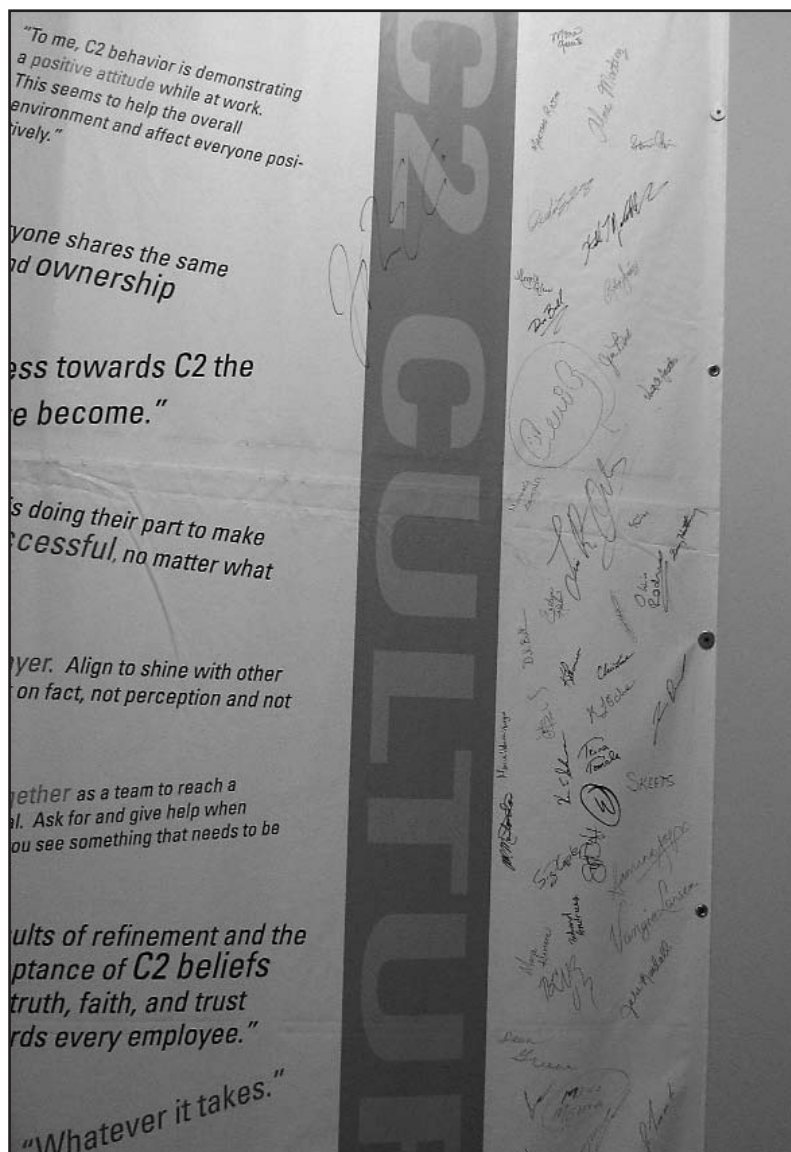


Figure 4. This shows details from a large 8-Beliefs cultural display board entering the Ventana production facility. The acronym "C2" refers to making a commitment to the Culture of Accountability. Note the signatures down the border of the display, but in the center of this photo. Employees literally signed on to a commitment to

Manufacturing Operations

Operations have two major divisions: instruments and reagents. The business model resembles razor-and-blades: place an instrument in a customer's lab, and the reagents for it provide a nice follow-on stream of income. But by Ventana's mission, employees want to keep that customer lab working in tip-top condition detecting tissue abnormalities.

Instruments are an electromechanical and software process. Reagents are a chemical process; quite different. The production areas for each are across a hall from each other, with doors closed to prevent contamination. By each door is an andon, like the patient lights over hospital room doors. Glance down the hall and one immediately knows if a team is having a problem.

Ventana's "volume" instrument is the BenchMark® XT series. It comes in several variations, depending on its purpose: more for heavy-duty hospital pathology, or for novel research detection. An XT is a complicated instrument, about half the size of a refrigerator. Figure 5 shows the production area for the XT.

Getting the machine right before it ships is the main concern. With a long takt time and much intrinsic imbalance between assembly of different modules, subassembly is set up to let operators move from one station to the next, self-balancing their work on the go. "Water spiders" load parts in specially-designed kit trays and bring them to each work station. This work design results in a little extra space, but it keeps skilled assemblers busy with value-added work at all times. As they further reduce the test time at the end of the process, Ventana will be able to crank out more machines using the same space. Confidence in their collaborative problem-solving abilities has become pretty high.

However, Ventana assemblers thrive on change. No sooner is one product line "leaned out" than another arrives. New production processes develop in parallel with the instrument design. A multifunctional team, including some operators, follows the 3P approach. Ideas start with fishbone sketches based on engineering drawings; then the floor is laid out for cardboard mock-up exercises. Finally real equipment is used to build prototypes. This start-up process keeps being refined with the objective of finding all the show-stopper problems before production begins, and most of the little ones too.

New operators need a day or two absorbing procedures and expectations



Figure 5. At right, a view of the BenchMark XT sub-assembly as it was being created using mock ups. At left, the BenchMark XT cell as it appears today, many kaizens later, feeding final assembly and test, which can be seen in the far background. Note the hanging shadow boards for tools, the hanging work instructions, and an andon for each station. Andon lights are called "And On" lights in Ventana.

before doing anything on the floor. Then they start in a simple cell with someone coaching them. Most are eager to learn, so they keep progressing, learning more and more positions until they become multi-skilled and experienced with problem-solving techniques. Ventana wants as many people as possible to also be able to move across different instrument lines, or even between the instrument and reagent sides of the floor. Because of the rapid growth, Talent Management to develop people and teams able to handle this work is a critical activity for managers. It's not just an HR training function.

Once they are experienced, operators are invaluable advisors on process changes. For example, as a result of kaizen they may run trials of competing solutions, keeping data on performance. If neither option is a clear winner, operators vote on which they prefer.

Ventana has one-piece flow in instrument assembly, which except for "tuning" the instrument, is much like any discrete manufacturing. However, "right-sizing" of reagent batches is more complex because of many per-batch requirements. Each lot

must be extensively tested before release. Time-sensitive stains present a dating problem. Each lot is set up to track field performance. Improving basic quality control to make batch-to-batch variance negligible has not been easy. Regulations and labeling for different countries introduces another area of potential error. That is reducing reagent batch sizes takes a great deal of technical and system development for every small gain. The nearest Ventana has come to one-piece flow in reagents is filling multiple-component kits (as for different stains) at the same time, rather than filling containers in batches; then sorting containers into kits for shipping.

Besides the small-step improvement in production, Ventana is creating some big-step improvements in R&D. They expect to hold the size of their own production area constant and improve the footprint and operations of their lab customers by designing new equipment that is smaller, but with more capabilities. And if customers can wring much more test information out of the same volume of reagent, Ventana does not need to make so much of the stuff.

Supply Chain

Ventana has stabilized inbound shipments using "milk runs" for machined, plastic, and sheet metal parts from suppliers in Phoenix. However, some of the specialty chemicals needed for reagents are made by single-source small companies unfamiliar with the demands of lean manufacturing. Many need help achieving lot-to-lot consistency, so several quality engineers work with them to bring them up to speed. New product designs try to avoid supplier problems if possible.

Forming long-term partnerships with suppliers is possible in some instances, but far from all. Because of technology revolutions, Ventana "changes every two years," so long-term agreements are risky. Don Ball, Senior Director of Global Supply Chain Management has a strategy to beef up the ability of Ventana to coach key suppliers on better management of the "off-site" inventory actually held by suppliers.

Distribution of reagents has been farmed out to a distribution center run by Fed-Ex. Customers frequently need overnight shipment and many reagents degrade over time, so sizing of stocks has to



Figure 6. SYMPHONY® is one of several lines of instruments and is a "business unit" (value stream) organization. The categories of performance measured are basic. SYMPHONY® being a new line, the baseline data for one section of quality performance is just now being compiled.

balance safety stock for immediate shipment with having to dispose of expired stock. Obviously, ability to produce in smaller batches and maintain chemical function for a longer time would help this situation. Nobody said that lean lacked challenges.

Selected Operating Performance Measures

Measure	Unit of Measure	2003	2004	2005	2006
Sales	\$ millions	\$132.3	\$166.1	\$199.1	\$238.2
Oper. Profit	\$ millions	\$6.2	\$26.1	\$38.0	\$47.8
Employment	Total Headcount	635	708	792	881
Value Added Per Person	\$ millions Mfg. Headcount	\$1.70	\$1.56 ¹	\$1.74	\$1.78
On-time Delivery	% Fill Rate	99.3	99.4	99.6	99.7
Energy Cost	Total Dollars (in thousands)	\$427	\$466	\$524	\$775 ²
Customer Complaints	Total Number Normalized Units	2.73	2.18	2.03	1.64
Lost Workday Injury Rate	Annual lost days 100 people	0.30	0.25	0.20	0.11
Employee Turnover	% leaving	11.1	10.7	14.0	13.5 ³

Figure 7. Figures for calendar year 2007 were not available at the time of publication. 1. Ventana got a little ahead of their growth adding people in 2004. 2. Energy costs for operations have risen slower than the increase in sales; energy costs for 2006 jumped because much of it was used for new construction on site. 3. Ventana employees are highly recruited by other companies, and the culture does not fit some people; this is one reason for the big emphasis on Talent Management. Work at Ventana is exciting and rewarding, but it is not a "country club."

How Are We Doing?

Performance measurement is prominent throughout Ventana operations. Production "linearity" (daily progress to schedule) is displayed at all cells, frequently on a big plasma screen. Each area posts performance measures that also are posted on a big wallboard that displays everyone's performance for all to see (Figure 6).

Hands-on employees manage each immediate operating process. At the end of each shift they huddle to assess what went right, the problems of the day, and sometimes commit to the culture again.

Senior managers manage the overall processes, including the direction of process improvement and the development of people. Managers of each area meet the third week of each month to review what they see by direct observation as well as by performance indicators. How are we doing financially? How are we doing against our 30, 60, and 90 day plans for improvement? Are we aligned with the goals of the company? Where they see a problem, they emerge from the meeting with root cause, a countermeasure, who is responsible, and when action will be taken.

Every quarter there is an all-hands company alignment meeting. The state of the company, financial and otherwise, is presented, along with at least one inspirational message. The action part of that meeting is for everyone to check whether their 30-60-90 plans coincide with the goals

of the company; if not, they may need adjustment. As a result, area managers may need to do a little liaison work too, so overall effort is self-reinforcing, not in conflict. And Ventana likes using cross-functional teams, so allocating people is a dynamic task.

This system bolsters Ventana's policy deployment. The mission is constant; but the main goals for each year change. But "deployment" of both goals and culture is ineffective without a follow-up system to assure that personnel are not drifting away from the original intent.

The overall performance data in Figure 8 has to be interpreted in the context of a fast-growth company dealing with new technology that takes some unraveling to get down pat. But if you like financial results, note that operating profit has climbed much more rapidly than sales revenue, partly due to lean thinking. This has made investors think highly of Ventana. A company with revenues around \$250 million currently has a stock market valuation somewhere north of \$3 billion.

Robert W. Hall is editor-in-chief of Target and a founding member of AME.

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