

**A New American TPM:
Leadership requirements for
breakthrough change**

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The BIG surprise: sale of the plant!

In August 1998 a big surprise happened: Clark Oil USA purchased the Lima Refinery from BP, for \$215 million (\$175M for the plant and \$40M for inventories). This reversed a decision in 1996 which was to close the plant .

BP’s point of view was that the plant didn’t make enough money for their criteria, a valid perspective that an owner could very reasonably take. Getting Clark Oil to acquire the refinery became a “win-win” situation for everyone. BP was able to reverse some of the accrued costs for closure and environmental remediation, which meant even more value from the sale.

To quote a senior BP manager:

*“This outcome is fully in line with our strategy and we are pleased to have achieved such a positive outcome for all concerned. Not only will the refinery remain in operation, but BP Chemicals at Lima will continue with its expansion plans.”*¹

Clark was motivated by financial results

Clark’s interest in buying the refinery stemmed from business results, achieved via a change effort we called “Proactive Manufacturing.” Reliability improvement efforts began in earnest at BP’s Lima Ohio Oil Refinery in 1995 and achieved stunning results by 1998 that have been sustained (worth \$43million per year), with improved safety and environmental results.

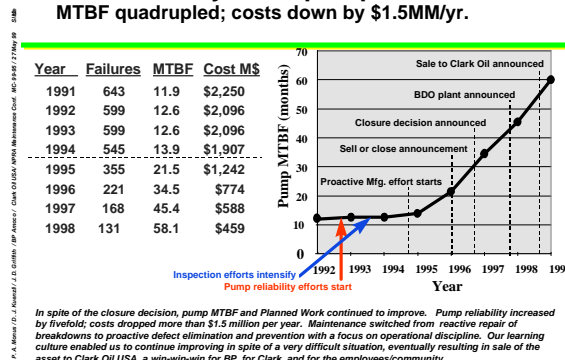
Large value was created in a short time, with minimal capital investment, by liberating

¹Shield Magazine, Issue 2, 1998, page 57. Quote is from Iain Conn, senior vice president for BP Oil who concluded the deal with Clark USA for the sale of the refinery.

worker’s good ideas. Key requirements and outcomes of these results are time for improvement work and the right “climate” for employees to take authority for implementing their own good ideas.

*“No matter how inevitable the forces of consolidation, the culture of a work force and the creativity of a community can still make a difference in the fate of a factory.”*²

Lima Refinery: Pump Repairs
MTBF quadrupled; costs down by \$1.5MM/yr.



In spite of the closure decision, pump MTBF and Planned Work continued to improve. Pump reliability increased by fivefold; costs dropped more than \$1.5 million per year. Maintenance switched from reactive repair of breakdowns to proactive defect elimination and prevention with a focus on operational discipline. Our learning culture enabled us to continue improving in spite of a very difficult situation, eventually resulting in sale of the asset to Clark Oil USA, a win-win-win for BP, for Clark, and for the employees/community.

Pump failures reduced from 600 per year (historic level) to only 131 in 1998. Freed-up resources were redirected into other defect elimination work, further reducing breakdown events and time consumed by these, in new areas and types of equipment. Cost savings are another key outcome: \$1.5 million less per year is spent on pump repairs. The bottom line improvements for all areas amounted to \$0.77 per barrel of oil processed . A big contributor to that is reduced loss of hydrocarbon to flares and the sewer (\$10 million/year).

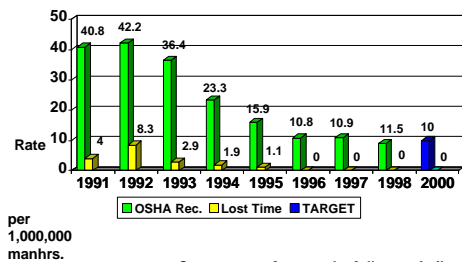
Refinery management set and achieved stretch breakthrough targets

Cash Margin Enhancement 1997 vs. 1994

	\$/BBL Crude 95 Basis
Higher Reliability	0.08
Hydrocarbon Loss	0.27
Process Optimization	0.22
Crude Delivery & Quality Costs	0.05
Energy Efficiency	0.06
Cost Savings Initiatives	0.07
TOTAL CASH MARGIN ENHANCEMENTS	0.77

²Wall Street Journal, “The Front Lines” column, Section B1, Friday, December 4, 1998

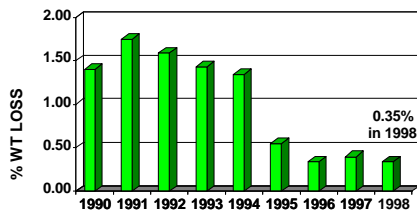
Employee Safety Performance



Contractor safety results follow a similar trend

We greatly improved our costs, but also helped the environment = win / win

Lima Refinery Hydrocarbon Loss



This improvement is worth \$0.27/bbl and has been sustained

The return on investment for the change effort is huge. If \$43million per year was generated in new value, and \$320,000 per year was the approximate incremental cost of the change effort (one full time person, some part time people, consulting costs, workshop costs, meeting costs, etc), then the return is about 143:1 (or 14,300%).

New leadership behaviors were needed

New and aligned **leadership behaviors** enabled these sorts of achievements:

- (1) from **authorities** (executive leaders who commit resources, decide the overall business context, and focus on *results*)
- (2) from **line leaders** (workers and operational leaders / managers who focus on *daily work*)
- (3) from **network leaders** (who research and focus on *ideas*).

We think the approach Lima followed (and results achieved) can be replicated in other places, but only if all aspects of the change process are understood, and only if all the needed leadership roles are skillfully applied.

“The cause” is the aligning factor

Building alignment of motivation and action between workers and authorities can occur through the means of an idea. If authorities can see that workers are sincere, and that the idea that workers are pursuing fits their view of the overall needs of the business, they will support the workers and line leaders.

The “cause” that workers were pursuing (in our case defect elimination and a precision plant) became something that workers and authorities got excited about and mutually supported, independent of each other. Getting both authority and worker to have the same attitude about “the cause” is key, because unless they develop the same attitude towards it, the strategy we pursued will not work.

New thinking, new behaviors

Success at Lima happened mostly through changes in the **thinking and behavior of the people** of the asset, individually and then collectively. We faced risk differently, learned to collaborate instead of compete, and shared learning and rewards differently. New decision rules that workers and managers followed to create the future they wanted were simple:

- 1) Eliminate defects
- 2) Improve precision of all work
- 3) Redesign equipment so it is fit for purposes of the business today
- 4) Focus more on long term value and sustainability, not on short term cost
- 5) Have the discipline to pursue the right things for proactivity, every day, in every decision
- 6) Make “don’t just fix it, improve it” a daily reality that we live by

A “bottoms up” change climate

Everyone, including workers, needs to take responsibility for reflecting on how we are thinking and impacting each other. As the means for this, we took the approach of

- (1) improving the work we do individually,
- (2) launching lots of self organizing cross functional action teams,
- (3) focusing on learning and dialogue,
- (4) trying to tap untapped capacity in workers.

Rather than management driving the change, we sought to create a climate to inspire workers *to take authority* via pursuit of their own good ideas, and then find their own capacity for

implementation. This created real ownership, meaningful work and thus internal motivation. We prioritized building internal capacity for taking action over the results themselves. We designed infrastructures “to not leave learning to chance” so that teams (including those which failed) would want to learn, so everyone would find more ways to succeed.

New capacity for dialogue

A key part of this new environment was enabling many types of interactions between groups and cultures that formerly had limited interaction. Workers and authorities met for dialogue. Cross functional communication improved via creation of area teams. Cross organizational understanding and communication (asset to asset within the refinery, and we to our suppliers and customers) also improved.

New organizational infrastructure

New structures, such as the CI (Continuous Improvement) Forum, emerged from trying to change the work. A conscious synthesis of tools and methods from TQM (total quality management) and the Learning Organization was used to support these efforts, including work on vision, productive conversation, systems thinking, and dialogue. We did not prioritize teamwork, or planning, yet teamwork and improved planning resulted from being able to restructure work, from a reactive to a proactive approach.

“Joy in work” provides motivation

“Joy in work” is one of the most powerful motivating factors we can access. Winston Churchill once said that “morale is a sense that what we are doing is the right thing.” The Manufacturing Game™ workshops played a key role in creating motivation for the journey to proactive manufacturing, via a *shared experience*. Understanding both the end state *and the journey* from the reactive starting point to the end state was the key to the Game’s effectiveness. Pursuing proactivity provides internal conviction that “we are doing the right thing” in workers, which leads to higher job satisfaction and morale. Pursuing proactivity was a very motivational thing for us. It was possibly the main thing that sustained us during the two years we had to operate after the announcement of sell / close.

Neither Worker nor Authority can succeed by themselves

A partnership between workers and authorities co-created the right environment for learning, sharing risk, and realizing value--by taking action

to pursue the right ideas in a sensitive way. Through working with each other, Authorities and Workers contribute to each other’s success, which strengthens their desire to collaborate.

We saw no alternatives to proactivity

As the external world, and the pressures of low margins pressed in we became more and more motivated that this journey was the ONLY reasonable option available to us. The only other option was to get out a large chain saw and cut off arms and legs (figuratively speaking).

Reluctance to try this approach

Because this “action team” approach of self organizing teams is so dependent on workers, who must freely choose to use their own untapped capacity for action, management might be hesitant to try it. Comments emerge, like “We can’t control the results” or “ We don’t have the motivation in our people.” To succeed we think you must assemble a management / leadership team that exhibits all three forms of leadership, in an aligned and coordinated way.

Spread of the Manufacturing Game™

These ideas are spreading throughout BP Amoco. Fourteen business units, involving over 2,000 people have participated in this approach. Our hope is that during 1999 several new assets will replicate the breakthrough results created at Lima Refinery during 1994-1998.

Lima Refinery Learning History

An indepth inquiry into “what happened” in the story of this transformation has been completed in the form of a “learning history,” with interviews with people from all around the system, including outsiders and executive leaders in Cleveland and London. This document “tells the story” in the words of the actual speakers, and shares many different perspectives. This document is “true to the data” and is research based, using academically rigorous qualitative methods. Contact the authors for more information.

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**Senior Project Manager
BP Amoco Chemicals
Lima, Ohio**

Paul Monus is Senior Project Manager, currently developing and implementing learning organization, system dynamics, and knowledge management processes for BP Amoco worldwide.

Paul's prior experience includes Manufacturing Manager, Process Technology Manager, and Area Superintendent roles for Barex, and the Area Superintendent role for Catalyst, HCN, Acetonitrile, Loading/Shipping at Nitriles. He was also Senior Technical Specialist for the Acrylonitrile process, and designed and started up plants in Japan and Switzerland.

As part of the Pacesetter facilitators network, Paul has spent the past 2 years working mostly in BP Oil and BP Exploration delivering Manufacturing Game and systems thinking workshops. Paul functions as an internal consultant-- training / coaching local site leaders and their management teams, designs program rollouts, and brings the ideas of the learning organization into practical use.

Paul has a degree in Chemical Engineering from University of Minnesota. Current interests include skiing, tennis, and the nature of leadership in a learning organization.

James D. Griffith (Jim)



***Manufacturing Manager
BP Amoco Chemicals
Green Lake, Texas***

Jim began his career with Standard Oil at Toledo Refinery in 1974 following his graduation from the University of Cincinnati with a BS Degree in Electrical Engineering. His earliest assignments were in refinery control systems, maintenance and operations. He served as Maintenance Superintendent and Superintendent for Oil Movement and Storage at Toledo before becoming Manager of Maintenance and Engineering at BP's refinery in Gothenburg, Sweden in 1988.

Upon his return to the states in 1991 he was the Manager of Commercial Operations for the Northeast Region of BP OUS. In 1994 Jim was named to the Ohio System Team as Manager of Plant Availability for the Lima site. He is now serving as Manufacturing Manager for the BP Chemicals Acrylonitrile facility at Green Lake, Texas. Jim is married to wife, Karen, and has three children ages 24, 20 and 8.

Donovan J. Kuenzli (Don)



***Refinery General Manager
Clark Oil USA
Port Arthur, Texas***

Don began his career at BP Chemicals, Lima, in 1965 where he held various operational and technical positions, including Nitriles Plant Manager. In 1984 he became Plant Manager at BP's Green Lake, Texas facility. He joined BP Oil's Refining Department in 1987 as Operations Manager at the company's Alliance Refinery. In July 1990, Don began an international assignment as Business Technology Manager in the M&S Business Development Unit in London and later as Manager of the Technology Development Unit. Don earned a BS Degree in Chemical Engineering from Ohio University and completed the Tuck Executive Program at Dartmouth College. He returned to Lima in June 1993 as Site Manager and became Refinery Manager in November 1996. He served in this capacity until the Refinery was sold to Clark Oil USA in August 1998, when he was named as Refinery General Manager for Clark Oil USA's Port Arthur Texas Refinery.