BEST PRACTICE TRANSFER – A PERFORMANCE IMPROVEMENT PROCESS

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ABSTRACT

In June, 2001, Duke Energy Field Services ("DEFS") began developing a process for sharing operational and maintenance best practices. With over 50 facilities and multiple cultures located in several states, sharing work and technical practices appeared to provide an excellent opportunity for significantly improving performance. In late 2001, DEFS began the rollout and implementation of several best practices. This paper will discuss: (1) how the process works, (2) practices that are being shared and (3) implementation successes and opportunities for improvement.

INTRODUCTION

In April 2000, Duke Energy and Phillips Petroleum (now ConocoPhillips) merged their mid-stream businesses to form Duke Energy Field Services. The new company – 70% owned by Duke Energy and 30% owned by ConocoPhillips – operates some 50 gas processing facilities and associated gas gathering operations in the U.S. and Canada. DEFS was a meshing of facilities from several companies – Panhandle Energy, Associated Natural Gas Inc., Mobil, Union Texas Petroleum Resources and ConocoPhillips. Most operations had their own methods and procedures and there was no mechanism for exchanging and sharing procedures and practices.

In June 2001, DEFS – with the assistance of Booz Allen Hamilton – began an inquiry into the value of developing and deploying a Best Practice Transfer ("BPT") process within its operation. Three themes emerged during the inquiry:

1. Transferring of best practice would likely improve operational performance, but
2. There was no clear shared view on how large an impact BPT could have on performance, and
3. A BPT approach would have to meet certain key criteria to be accepted and successful:
    - Minimal bureaucracy
    - Objective way to ascertain "the" best practice
    - Selection on value – not just trying to drive consistency
    - Tangible
    - Owned by operations
    - Sensitive to cultural divides but supportive of convergence

The result was the deployment of a project to develop and deploy a BPT approach to performance improvement. The project had the following phases:

1. Business Impact and Approach – this phase would determine the potential impact of a BPT approach, develop a shared view on that impact and an approach that meet the key criteria above.
2. Resource Budgeting and Piloting -- this phase would pilot the approach and confirm the impact.
3. Broader Rollout – based on the pilot results, a broader rollout of the approach would be developed -- if appropriate.

BUSINESS IMPACT AND APPROACH

Business Impact

Experience with BPT programs had shown that there is often a significant performance differential among multiple comparable entities within a company (see Figure 1). While one operating asset may be particularly adept at certain functions that same asset may lag its peers in other functions. Much of the variation lies in the processes, tools, work methods and capabilities employed. By analyzing the variation in performance practices and results one can establish a baseline target of potential benefits extracted through a BPT program. It was this principle that drove the development of a BPT business case. The business case development was approached from two angles – a "top-down" valuation methodology and a "specific opportunity" valuation methodology of target opportunities.

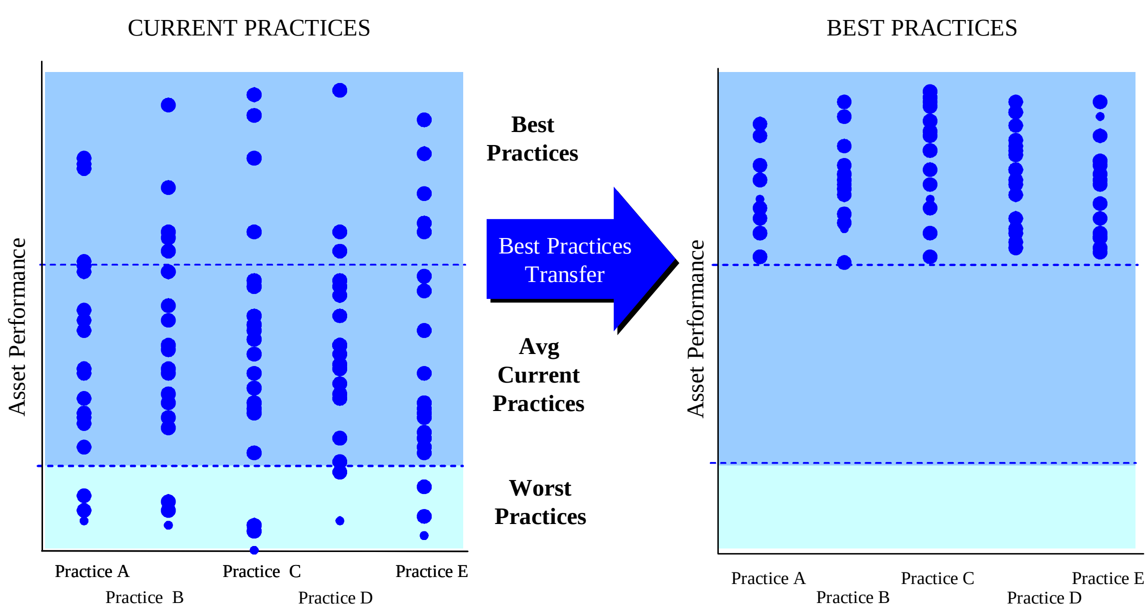


Figure 1 – BPT Concept

Top-down valuation methodology

The top-down valuation methodology determined the value of opportunities based on performance variation observed across operating assets. As shown in Figure 2, the methodology included:

1. Analysis of performance differences for both plant and gathering system assets
2. Filtering performance differences that were attributed to structural and commercial factors
3. Normalizing data to ensure comparison of like assets
4. Quantifying opportunities that result from moving "low performers" to the average of its peers.

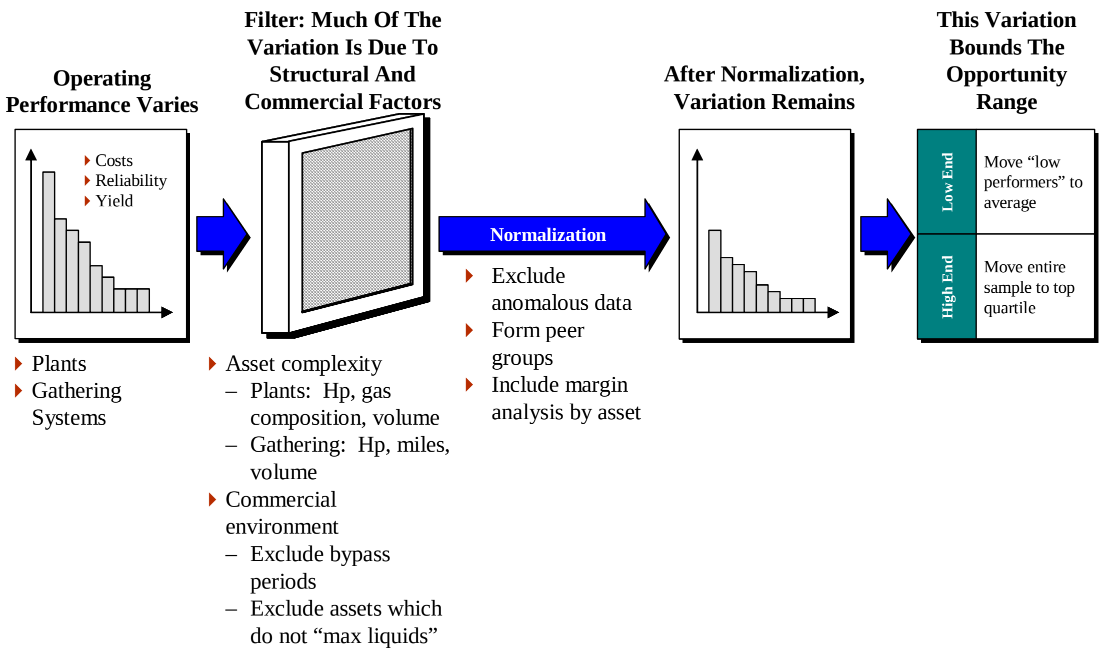


Figure 2 – To-Down Valuation Methodology

Filtering out structural factors was especially critical as real performance variation is often a result of uncontrollable structural differences. For example a gas plant that processes sour low-pressure gas and discharges into a high-pressure transmission system cannot be expected to have comparable operating costs to a plant processing sweet high-pressure gas discharging into a medium pressure transmission system. Plant structural differences were represented by "complexity", a factor that was defined based on a plant's processing technology, inlet gas quality, installed plant horsepower and throughput. Similarly gas gathering system structural differences were represented by complexity, which included system installed horsepower, volume and pipeline mileage.

Variation in operating performance showed opportunities to reduce fuel consumption, increase equipment availability (and online time), and reduce operating and maintenance expenses. These opportunities represented a significant increase in the company's annual operating income . Quantifying the value of these opportunities was based on assuming underperforming assets could achieve par performance of the group. The valuation therefore conservatively excluded the very real opportunity that exists for improving performance of all assets.

Specific opportunity valuation methodology

The specific opportunity valuation methodology based value estimates on an observed practice and its applicability across the company (see Figure 3). For each specific practice the following questions were answered and quantified:

1. Where is this a new process?
2. What is the value of the process?
3. What equipment applies?
4. What is the criticality of the equipment?
5. What is the potential applicability and associated value?

Description	Low Value	High Value	Source
Throughput baseline (bcfd)	7	7	2001 DEFS plant throughput data
Asset applicability	65%	80%	First cut approximation knowing that only a few assets utilize engine analysis maintenance; and knowing that some assets perform well without the engine analysis maintenance approach
Equipment applicability	70%	70%	DEFS Master Equipment List; number of engines in Gathering System vs. total engine fleet
Equipment criticality	90%	90%	At least 90% of equipment is critical to operations
Overall applicability factor	41%	50%	
Baseline On-Line availability	96.4%	96.4%	Analysis based on sample of DEFS GS measures
On-Line availability target	98%	98%	Interviews
Sample best practice on-line availability	98.5%	98.5%	Analysis of sample average on-line availability if all performers below 98% are moved to 98% level
Throughput increase percentage	2.2%	2.2%	Percent increase in throughput based on on-line availability increase
Throughput increase (mmcfd)	63	78	Throughout Increase Percentage multiplied by Total Throughput
Value of incremental mcf throughput	$0.20	$020	Illustrative Example
Value of increased throughput (MM$/yr)	$ 4.3	$5.4	

Figure 3 – "Specific Opportunity" Valuation Methodology Example for Engine Analysis Practice

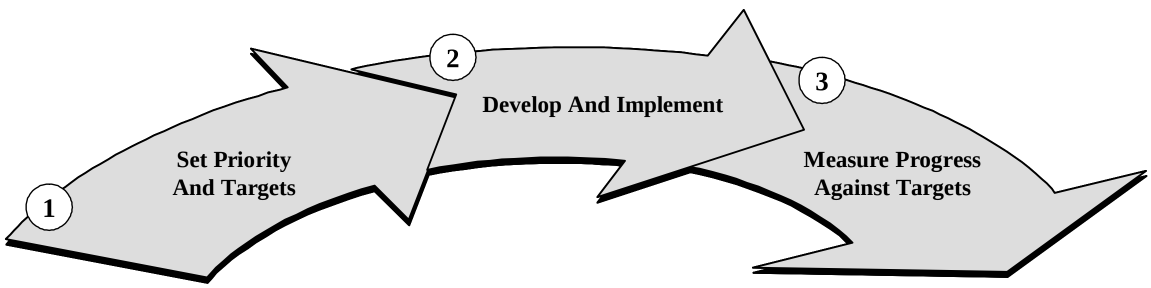
Three specific practice areas - engine overhauls, engine analysis maintenance and horsepower optimization - were quantified in this manner. The total opportunity identified with these three specific practices alone was 50% of the improvement opportunity estimate established through the "top-down" methodology. The team felt comfortable that the top-down estimates were truly conservatives and at the same time showed the tremendous opportunity for sharing practice and capturing significant value.

The final step in business case development included an economic analysis using both expected benefits and estimated BPT program costs as key inputs. Since the program costs of a BPT program are relatively small, the economics associated with the proposed BPT program was overwhelmingly positive using even the most conservative opportunity estimates. The program was given approval to move to the next step – what approach would best serve the company on identifying, implementing and managing a BPT program.

Approach

A BPT program involves identifying superior capabilities, transferring them from function to function across business units and then systematically monitoring and realizing results. Within DEFS, these key steps were administered by a geographically and functionally diverse senior level management team, the Operations Performance Committee (OPC).

The OPC facilitated the sharing of funding, resources and expertise across geographically, culturally and functionally separate operating areas. The OPC set priorities and targets, developed and implemented specific initiatives and measured progress (See Figure 4).



- Determine priority placed on operational improvement
- Develop short-term and long-term targets

- Develop specific initiatives to drive operational improvement
- Prioritize, resource and ensure implementation of the key initiatives

- Track overall progress of OPC efforts
- Communicate goals and objectives to stakeholders
- Recognize employees contribution to performance improvement

Figure 4 – The BPT Process

Specific best practices were proposed by the OPC and their respective organizations. These were screened and prioritized based on initial cost/benefit analysis. High priority practices were then approved based on detailed business case development that included documentation of practice definition and variation, valuation of drivers, application of the practice across asset areas and implementation difficulty. Once approved a detailed implementation plan for the practice was developed. The plan included assignment of a sponsor from within the OPC, cross-regional launch team staffing and cross-regional asset selection for application of the practice.

RESOURCE BUDGETING AND PILOTING

Overcoming limited resources and an "I don't have time" mindset are major hurdles for implementing a BPT approach within the operating units. To ensure the best opportunity for success, piloting was used as a key first step to acceptance and for quantifying the resource requirements and the benefits.

Two of the best practices that were initially selected for piloting were Engine Analysis and HP Curves. The Engine Analysis practice involves utilizing engine performance analysis equipment and techniques to enhance predictive maintenance, optimize engine efficiency and reduce equipment downtime. The program includes equipping and training staff to analyze running equipment in order to define and schedule maintenance based on performance (instead of time or hours) . Success is gauged through the reduction of maintenance costs and downtime (both planned and unplanned)

The HP Curve practice involves developing and utilizing compression curves to ensure compression equipment is optimized for the desired balance of required power, throughput and compression . The program includes developing compressor curves where none exist and training personnel to utilize them to guide adjustments to compression equipment in response to changing field conditions.

Once the practices were initiated in an operating asset most of the involved parties developed enthusiasm for the possibilities and clearly embraced the concept of sharing best practices. This was especially evident when benefits were captured, documented and shared.

The BPT program has had great success within its areas of application. However extending enthusiasm beyond the core group of individuals represented on implementation teams has been an ongoing challenge. The "best practice" does not appear as "extra work" at a facility that has the practice, but getting it installed at a facility that is adopting the practice can appear as "extra work". In a meeting with one operating manager, he pointed to several files on his desk and stated that each represented a good idea or project that should be considered. While unstated, the points he made were many:

1. What constitutes a good idea or a best practice?
2. Why should a "corporate-driven" practice be more important than one of the locally proposed ideas or practices?
3. What are the criteria for implementation? Ease of implementation? Cost of implementation? Buy in from employees? Financial Returns?
4. What's in it for me? For the employee? For the company?

SUMMARY

It is estimated that the seven (7) best practices presently being spread across DEFS will improve operating income by over 20 cents per MMscf (see Figure 5). Since its inception, the BPT program has continued to foster and accelerate performance improvement. Within 5 years, the rollout of this initial set of practices should be complete.

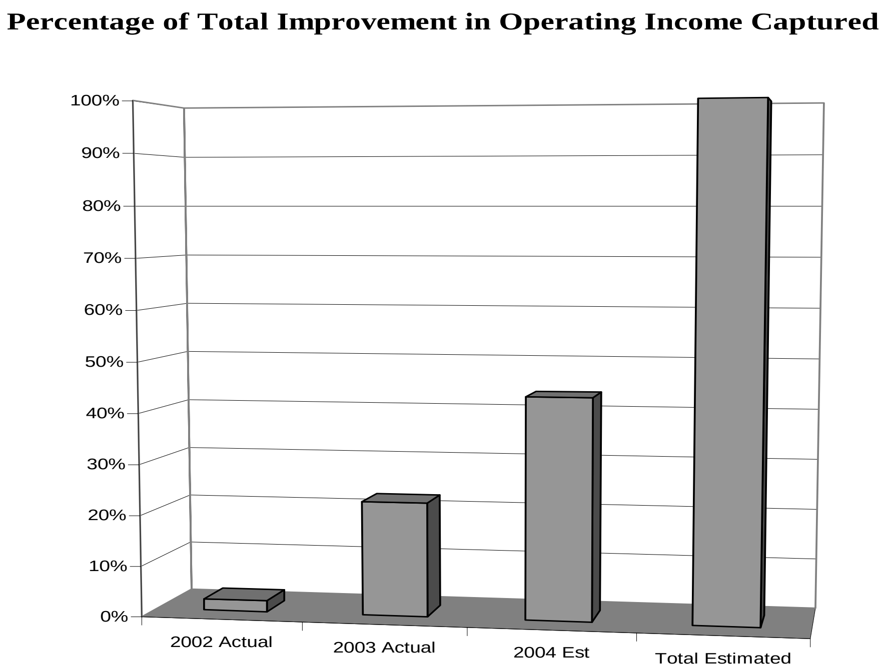


Figure 5 – BPT Progress

A BPT program requires a high level of commitment and "staying the course" by management. While the investment cost is minimal and the payout large, operating management has to ensure that resources (mostly manpower) are redirected to adopt the practices within their facilities.

BPT work can initially appear as "extra" work and adopting practices that "weren't invented here". So there can be a significant amount of push back and resistance to adopting a new practice. Already strapped with limited resources, this new employee resistance can strain operating management's commitment to the BPT program.

It is obvious that the sum of individual best practices, shared and implemented across the operating areas, is greater than the whole of the status quo. Fostering this learning environment in a time of continuous change is an ongoing challenge that can only be overcome through ongoing commitment at all levels of the organization. While the BPT program is proving to be a powerful approach in which to achieve both immediate and ongoing improvements in bottom line financial and operating performance, we continue to explore ways to accelerate and ensure adoption.