



DOW CHEMICAL COMPANY

Teaching Note

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The Dow Chemical Company case provides an overview of the WRAP program, an abbreviation for Waste Reduction Always Pays. The Wrap program has been implemented as a contest among proposals for small-scale capital investments. Historically, the contest format was initiated at Dow in 1981, in the context of energy-savings proposals. The scope was broadened in 1983 to include yield improvement, and waste reduction was added in 1987. The program has continued successfully into the 1990's and has been credited with annual savings on the order of \$10 million. The case provides an opportunity to examine WRAP as an example of an employee-centered initiative aimed at reducing pollution. It also provides a good opportunity to elaborate on the concepts of Total Quality Management adapted to the environmental area.

Class Discussion

The main class discussion can be centered around the strengths and weaknesses of the WRAP program. The list below covers several facets of this discussion. Nevertheless, simply asking for the pros and cons may not bring out all the relevant points. To sharpen the analysis, it is helpful to ask what characteristics of the WRAP program resemble generic implementations of TQM, and, similarly, what features of TQM seem lacking in the WRAP program. Other dimensions can be elicited with pointed questions, such as: If you were a

superintendent in the Louisiana Division, would you support the program?

In addition, there are a few issues in the case which create a good debate even if there may not be good resolution. Some of these are related to TQM, as discussed below.

Basic discussion questions

1. What are the positive impacts of the WRAP program?

The goals of the program are clearly stated. For employees, it is clear that WRAP symbolizes Dow Chemical's desire to reduce pollution and the belief that reductions can be accomplished in a cost-effective manner.

Participation in the contest is relatively easy. There are no big obstacles to would-be entrants. The proposal form is streamlined, with only the substantive highlights required, and only one copy needs to be submitted. The other requirement is the oral presentation to the coordinating committee, but steps have been taken to reduce stress levels that might otherwise accompany this stage of the process.

Specific measurements are required. In particular, the proposal must exhibit both physical and return on investment (ROI) data, anticipating waste reduction and financial benefit, respectively. The use of standard measurements is consistent with the company's broader commitment to continuous improvement and with its accounting philosophy as well. In addition, it adds discipline to the process of generating ideas.

The program has top management support. The most visible role of top managers is their participation in the awards ceremonies. The use of visible off-site location reinforces this point. Another aspect of top management's support lies in the fact that the WRAP program is not budgeted. For the time being, at least, management has been willing to fund virtually all of the proposals that were selected as winners. Most of these show an ROI above 30%, but, as the case explains, low-return projects are sometimes part of the winning package as well.

The program is credible within the organization. Aside from top management support, the auditing process is another feature of the program that helps to assure that the "rules" are followed. The formality of the Idea Book, as a follow-up, also consolidates some of the lessons from the various projects.

The program has hardly any bureaucracy. There is no full-time "WRAP guru" working with a large staff to run the program. The coordinating committee is part time, as many of the members have substantial line or staff responsibilities elsewhere.

The recognition/reward structure is an integral part of the design. Participation in the contest is obviously a high-visibility feature of the program that throws the spotlight on participants. The large majority of the participants are eventually declared winners, and

winners derive an additional reward: they are entitled to implement their proposal. Implementation means that they not only get the credit for their original idea, but they also take responsibility for managing the people, resources, and schedule of project. Since the submitters are typically junior engineers or operators, this gives them a special opportunity that they would not ordinarily get in their normal job assignment.

The program motivates employees to participate. Obviously, the sustained growth in the numbers of participants is testimony to sustained motivation. (Actually, the number of winners in the “energy” and “yield” categories has not declined very much since the “waste reduction” emphasis was added in 1987.) The case indicates that supervisors are supposed to take contest participation into account in their annual evaluations, but there is no specific link between contest success and eventual promotion. On the other hand, consider the skills that contest winner has shown. In the course of submitting a proposal, the submitter analyzes a problem, makes a decision about the best way to proceed, backs up the proposal with data, presents the proposal to a (multifunctional) group of managers, takes responsibility for implementing the project, and ultimately submits to a final audit. The skill-building required of winning entrants is obviously a sample of desirable qualities for management, and therefore it is not surprising that promotions tend to follow winning entrants.

Within the Division, managers do not compete for waste reduction funds. As designed, the WRAP program identifies good projects first, then it provides them with funds. Organizations typically do the reverse. Under the WRAP program, managers do not have to fight over the limited resources in a fixed “pie” of investment funds. At least for the time being, the aggregate demand for such funds is within top management’s inclination to supply the funds.

2. What are the deficiencies of the WRAP program (and how might its design be improved)?

There are a few debatable features of the program where there is no clearly desirable answer. For example, should there be a direct financial reward to winners (such as a share of the financial benefits)? Is a competitive structure the best way to draw out participation? What is the appropriate role of the plant environmental staff, when WRAP is largely administered through the line organization? Assuming that the cost analysis is based on accounting data which sometimes contains artificial environmental charges, are the employees being manipulated unfairly? Additionally, should the scale of the savings matter (a 30% ROI on investment of \$1 million is worth a lot more than a 100% ROI on a \$25,000 investment)? Aside from such concerns, some systematic weaknesses do exist.

No priorities in the spectrum of waste reduction options are recognized. Although source reduction is the preferred response, compared to reuse and recycling—and certainly to treatment or disposal—there is nothing in the program to orient participants in that direction. Perhaps there should be a special class of winners for proposals that involve source reduction and elimination of environmentally sensitive materials.

The “technology transfer” phase seems relatively passive. It is hard to tell whether the Idea Book is really effective, or if imbedding winning ideas in future training workshops has the desired impact. With two dozen plants in the Louisiana Division alone, and several more that are likely to be technologically similar in other divisions, the potential to leverage a winning idea across the company seems worth more attention. Perhaps another kind of award could be given for supplementary implementations after the first.

Are there sufficient incentives for higher managers to support WRAP? The case does not provide much direct information on this point, but we can infer that there is at least some motivation on the part of managers. As noted earlier, there are no capital budgets for waste reduction in the Louisiana Division; therefore, a superintendent can acquire more funds to make improvements in the plant by encouraging more WRAP activity. In addition, relating to the association in the plant by encouraging more WRAP activity. In addition, relating to the association between winning and getting promoted, a manager derives some status from the ability to deliver promotions to junior engineers and employees. To the extent that participation in the WRAP program correlates with promotability, managers who support the program may appear more effective at delivering promotions. Still, it is unclear to what extent managers are measured on the participation or the results in their organization emanating from the WRAP program. Perhaps this dimension of the program should be enhanced.

Participating does not seem widespread. Compared to some TQM programs that aim for virtually 100% employee participation, the WRAP program level is modest indeed. Recall that the division employees roughly 2300 people, while the winning energy and waste reduction projects represented something like 120 individuals and teams in 1992. Even if these were all teams of five, there is certainly room for additional participants. Perhaps the rewards should, in fact, become a bit more tangible, at least if greater participation is desired.

The team philosophy is not explicitly addressed. In fact, the original design was oriented to engineers competing as individuals. However, as the case indicates, it became apparent over the years that teams could provide more effective solutions and could share the workload. Give that one of the goals is to promote some form of systems thinking, a more formal team emphasis seems desirable.

The functions focus is strictly on production. Obviously it is Dow’s choice to empathize waste reduction in production operations, and there may be other programs outside of the WRAP umbrella that apply to marketing, maintenance, and product design. Perhaps, to go a little further, there needs to be more of a life-cycle philosophy in the approach to waste reduction. Unfortunately, the case is not comprehensive enough to document other initiatives at Dow, but articles on WRAP often leave the impression that the manufacturing function bears most of the responsibility for pollution prevention.

The link to corporate strategy seems missing. In TQM implementations, the sequence is often as follows: first, develop participation and enthusiasm with small successes, then move to more of a results orientation (leveraging program resources to obtain the largest

types of benefits), then make sure that the activities are consistent with the strategic emphasis of the firm, and, finally, try to instill quality-improvement thinking and behavior in the everyday routine of the workplace. On this spectrum, WRAP has generated participation and achieved results. However there is little in its structure to orient participations to strategically critical directions.

A customer focus is missing. This is not a critical deficiency in the context of the WRAP program, but the comparison with TQM and continuous improvement should lead to the question of where the customer fits into all of this activity. The linkage is undoubtedly indirect, but it occurs through combination of the points raised above—that is, a life-cycle framework, the strategy of the firm, and the role of other functions (especially marketing) in that strategy.

Contrasting approaches

If the class has also been assigned to read the companion case (Dow Chemical Company (B): Waste Reduction at Bayside), then some points can be underscored by contrasting the two approaches and asking the class what they would expect to find in the Bayside Division. At Bayside, waste reduction is lodged into the continuous improvement program, which relies on training in statistical process control and problem-solving techniques, supplemented on occasion by a suggestion box for ideas. As a result, one would expect that the ideas generated at Bayside Do-Check-Act (PDCA), whereas at Louisiana there tend to be more process changes. These tendencies are reinforced by the fact that WRAP is traditionally aimed at engineers. The contest entrants are often teams to be sure, but the normal mode is for the proposal to be engineering drive, with supplementary support from operators. At Bayside, by contrast, the continuous improvement program appears to be operator-driven, with engineers in a supplementary role. It is plausible that in such a case the Bayside projects would be less technical than the Louisiana projects, more focused on a limited area of the plant, and less likely to be interfunctional or to involve downstream operations. In fact, the scale of the Bayside projects appears to be small compared to those at Louisiana, and Bayside participation seems modest, as there are fewer projects in Louisiana. However, this may be misleading, because Bayside may be doing several compliance-oriented projects, as opposed to the WRAP projects at Louisiana, which tend to be beyond-compliance initiatives that improve the bottom line.

The Bayside approach has its own pros and cons. As a spin-off of the continuous improvement philosophy, the approach is grounded in employee involvement (and, hopefully, in employee empowerment). Among the five goals in the program, Bayside management may prefer to emphasize employee awareness in preference to cost reduction. By doing so, Bayside builds a broader base of employees who can attest to their company's green intentions when they are away from work in the local community. In this sense, Bayside operators may be ambassadors for Dow (which has also received some publicity for its special efforts in community relations.) As it happens, Bayside did not have an incinerator on site at the time of the case, but the incineration, a dedicated

workforce would have been very helpful in the effort to develop community acceptance of an industrial incinerator.

The major weakness of Bayside's approach seems to be that its managers have little incentive to support the program, and their involvement is minimal. Not that no screening audits or post-audits are done, and there is not public awards program. Bayside managers do not have to invest much of their time in the waste reduction program. In addition, the funding process is traditional at Bayside: budgets come first, then projects. In this scheme, waste reduction will compete with other capital projects (such as capacity expansion), and it may be difficult for managers to devote very much of their investment budget to waste reduction.

The Bayside program was actually considered weak within the company. By late 1992, some observers considered it all but dead as a waste reduction initiative. In class, asking why this might have been the case will bring out some of the relevant points that may not have surfaced earlier.

Sources

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Portions of the article "What Does It Mean To Be Green?" by Art Kleiner (*Harvard Business Review*, July-August, 1991, 38-47) also contain some material on the WRAP program.