

Self-Regulation, Laws, and Costs in the Chemical Industry:

An Analysis of Union Carbide Corp.'s Form 10-K

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**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**

Washington, D.C. 20549

FORM 10-K

**Annual Report Pursuant to Section 13 or 15(d) of the
Securities Exchange Act of 1934**

FOR THE YEAR ENDED DECEMBER 31, 2004

Commission file number 1-1463

UNION CARBIDE CORPORATION

(Exact name of registrant as specified in its charter)

New York
(State or other jurisdiction of
incorporation or organization)

13-1421730
(I.R.S. Employer Identification No.)

400 West Sam Houston Parkway South, Houston, Texas 77042
(Address of principal executive offices) (Zip Code)

Registrant's telephone number, including area code: **713-978-2016**

Securities registered pursuant to Section 12(b) of the Act: None

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports) and (2) has been subject to such filing requirements for the past 90 days. Yes No

Indicate by check mark whether the registrant is an accelerated filer (as defined in Rule 12b-2 of the Act). Yes No

At February 18, 2005, 1,000 shares of common stock were outstanding, all of which were held by the registrant's parent, The Dow Chemical Company.

The registrant meets the conditions set forth in General Instructions I(1)(a) and (b) for Form 10-K and is therefore filing this form with a reduced disclosure format.

Documents Incorporated by Reference

None

Link: <http://ccbn.10kwizard.com/download.php?repo=tenk&ipage=3283470&format=RTF&cik=0000100790>

Union Carbide Corporation is today a chemicals and polymers company whose existence can be traced back to 1898 with the founding of the Union Carbide Company. The company's growth over the twentieth century included a number of significant milestones, including the founding of the petrochemical industry as it is understood today. Its reach spanned several industries, including consumer goods, until the 1980s and 1990s, when many of the businesses were divested or spun off as independent companies while UCC became a holding company in the chemical industry. In 2001, The Dow Chemical Company executed an \$11.6 billion transaction for Union Carbide Corp., making it one of its own wholly-owned subsidiaries.¹

Although the corporation's history spans over one hundred years, the firm is often remembered for the unfortunate accident at its Bhopal, India plant in December 1984. The cause of the accident is of little interest to the discussions in this paper; opinions diverge as to whether the accident was caused by negligence on UCC's behalf or by sabotage carried out by an employee. All things considered, an accident such as the one Bhopal is an outlier in the universe of possible environmental problems a firm may endure. However, an incident such as Bhopal does motivate a curiosity about the kinds of customary environmental issues that a typical chemicals firm such as Union Carbide may endure during its yearly operations.

Union Carbide must carefully walk the line between keeping the government at bay, showing the public that it is making some efforts to keep the environment healthy, and leveraging its own interests. Its survival hinges on its ability to illustrate in economic terms that the corporation takes environmental matters seriously, and that it is taking action. As such, it becomes clear from examining the firm's Form 10-K that three subjects which are material to its environmental matters are industry-imposed environmental standards, the economic motivations of Superfund law, and cost estimation policies enforced by the corporation.

¹ This brief history of the firms was gathered from UCC's website: <http://unioncarbide.com/history/index.htm>

As disclosed in its filing, Union Carbide is a member of the Responsible Care program, which sets for the industry the goals environmental, health, and safety (EH&S) performance improvements and public accountability. Following its merger with Dow, the firm also implemented Dow's EH&S management system in order to "minimize environmental risks and impacts, both past and future." This adherence to standards, especially in a scenario where the firm is voluntarily committing itself to stricter standards than those called for by the government, is beneficial to the firm in a number of ways.

Standards give the firm a concrete goal to achieve with respect to modulating its emissions, creating a direct measurement of the actions the firm took to preserve the environment. It allows UCC to show to the government and the public hard data that it is indeed doing its part in abating pollution. In this case, where the entire chemical industry has taken it upon itself to regulate its members beyond the requirements of the law, firms like Union Carbide seem to express genuine concern about the environment. An economic evaluation of the situation indicates alternative motivations. It is possible that self-regulation corrects standards closer to where the firms would like them; that is, the legislation in place does not motivate what the firms see as the industry equimarginal of the costs and benefits of having particular environmental compliance goals in place. The firms in the industry perhaps find that it is to their benefit to embrace rules more stringent than those required in order to keep governmental scrutiny at bay.

This sort of self-regulating action has manifold repercussions. The public enjoys the benefit of the actual socially optimal level of pollution generation because of the industry's own self-interested actions. Politicians have hard evidence for their electorates that firms are exceeding the expectations that the law has set forth for them. A final benefit of standards is that they create an incentive for firms to minimize the costs of meeting them as quickly as possible.

Superfund law is a predominant motif throughout much of UCC's discussion pertaining to environmental matters. Of importance to UCC is that in 1995, the output tax imposed by CERCLA expired, and there has since been pressure from various groups to renew the tax.² Nevertheless, the charges leveraged through CERCLA against UCC weigh in to the tune of \$104 million in 2004 alone; \$39 million are for Superfund reparations. Given these pressures and the firm's situation, UCC can present to the government a better plan, should it call for on.

The corporation can reasonably assert a number of economic facts. Superfund places a Pigouvian tax on the firm's output which uniformly raises the marginal costs by a particular amount. The firm, in turn, is left with no other choice but to cut back on output to optimally operate where the new supply meets the old demand. What UCC can argue is that, if the government grants it some more flexibility in modulating its pollution, the firm can produce a higher output and lower prices—altogether a Pareto improvement.

The firm's argument should be one for the creation of a marketable permits market with taxation for emissions rather than output. This sort of mechanism would enable the firm to modulate pollution in two other ways, besides simply making cuts in its output: it can apply its research and development expertise to devise ways of using fewer, perhaps cleaner, inputs, and it allows the firm to apply the technologies it owns to reduce its actual emissions. By default, the firm has a motivation to improve its abatement technologies to avoid paying the rather expensive tax. By allowing only petrochemical companies to operate in the market, the government can be sure that no exogenous distortion will be imposed by environmental groups. In addition, Union Carbide can show to the government its ability to relatively cheaply monitor emissions across the industry as it had done before the tax expired. While the firm benefits from all of this, so would the government; the taxes collected would ideally be used to finance the clean up Superfund sites.

² See <http://www.ncsl.org/standcomm/scenvir/EvUV4N2.htm>

As previously discussed, self-regulation may be the industry's way of motivating what it sees as the optimal level of effort to keep costly government intervention at bay. In turn, it is expected that each firm would minimize the costs of complying with this agreement by carrying out a cost-effectiveness analysis. This analysis would almost surely yield different results for individual firms, indicating to each of them a unique manner in which to minimize costs. This is where the most disagreeable actions taken by UCC are rooted.

Dow's acquisition of Union Carbide involved implementing Dow's 1996 EH&S management system (EMS) goals at all UCC sites. Dow's EMS has among its goals a reduction in 90 percent of leaks, spills, fires, and explosions and 50 percent of chemical emissions, waste and wastewater. The problem at hand is fairly simple in nature: while these goals are valid for Dow's cost-effectiveness analysis, they are almost surely incorrect for Union Carbide's facilities. Seeing as UCC is dealing with the same industry-imposed constraints as Dow but operating with different technologies, UCC ought to *at least* conduct its own cost-effectiveness analysis to find out the extent to which it should be abating pollution.

It would be in the Union Carbide's best interest, therefore, to instead undertake a cost-benefit analysis of its situation. The firm should make its best attempt to quantify all of the marginal costs of increasing rates of abatement along with all the marginal benefits those various abatement levels would yield. The intersection of the two independent functions would be the optimal level of pollution for the firm to abate. While the cost-benefit analysis will almost surely not indicate the same abatement level required by the cost-effectiveness analysis, it will indicate the actions the firm needs to take to minimize cost at that abatement level. The firm may discover that its technology allows it to abate more than the required rate very cheaply, or in the worst case, that the industry regulations force it to abate beyond what is actually socially optimal.

An exploration of Union Carbide Corp.'s disclosures for investors and the government under the light of the theoretical frameworks developed in environmental economics research allows for keen insights into the nature of the environmental issues endured by a typical firm in the chemical industry. The firm's motivations with respect to its industry's self-regulation, the body of laws with which it must comply, and its cost estimation methodology each take on added significance when understood strategic in economic terms. Notwithstanding these points, there are at least a couple of additional aspects of UCC's environmental dealings worth exploring.

The first of these aspects relates to the firm's expenditures on environmental matters, particularly prevention. Capital expenditures on prevention have grown steadily for the past three years: \$26 million in 2004, \$20 million in 2003, and \$9 million in 2002. This suggests that the firm is forecasting rapidly increasing costs for fixing environmental problems, and thus would rather not take that chance. An interesting direction for study would be to compare the growing expenditures on environmental protection versus alternative remediation schemes, especially considering what fraction the costs of litigation take up in such an expensive process.

The second direction for research is especially interesting for the mathematically inclined. Union Carbide has been involved in a slew of asbestos-related lawsuits as a result of products it has sold in the past. Because the potential costs involved in these suits are material (\$1.27 billion to date) and continue to accrue, UCC has disclosed estimates for the additional costs it could face through 2019. In order to make such estimates, the firm is required to make some conjectures regarding the variables it faces: rate of filing, average value per resolution, etc. Two avenues for exploration are present. First, each assumption could be econometrically tested to determine its validity in the forecast. Second, the firm could examine how much variation it perceives in these forecasts given changes in the magnitudes of these assumptions when making these estimates.