RESEARCH FUNDING

PHILLIPS PETROLEUM TRIMS ITS CAPITAL R&D

BARTLESVILLE, Okla.—Corporate raiders are doing more than terrorizing major companies: their tactics are having an adverse effect on long-term research and development, even in biotechnology. Case in point: Phillips Petroleum Company.

When the takeover threats of T. Boone Pickens and Carl C. Icahn forced the recent recapitalization of Phillips, one of the hardest hit areas of the company was its capital R&D budget, sliced from $20 million down to $5 million. Although Phillips' total R&D budget remains over $100 million, its planned $15 million yeast fermentation plant in Nebraska has been scrapped. Through its Provesta Corp. subsidiary, Phillips has been developing and seeking to market technology to produce single-cell protein from proprietary yeast strains.

"We see this slowing down most of our products," says Provesta president John Norell. "For the next few years we're not going to be able to expand." Belt-tightening due to takeover threats and merger rumors force companies to stress short-term expenses. "This merger-mania has a devastating effect on new technology development in America," he says. "Just to survive for the next few years, you decide not to do the long-range development work."

"Clearly, the highly leveraged company has less flexibility and resources to deal with the future, especially long-term research," says Gar Royer, director of the biotechnology division at Amoco Corp. (Naperville, IL). "Research takes it in the neck after a recapitalization or a merger." Although Amoco is certainly not in Phillips' situation, the company is planning to issue additional voting preferred stock as a defense against possible take-overs. Royer stresses that Amoco's research program and emphasis on developing new technologies will not be curtailed.

Norell emphasizes that Phillips remains optimistic about the long-term possibilities of its biotechnology program. He says Provesta is seeking alternative means of capitalizing its plans, such as joint ventures and bank financing in return for equity. Provesta is still trying to license its technology in places like the Middle East, Southeast Asia, and the People's Republic of China, although no deals have been set yet.

Norell is, however, somewhat worried about the morale of Phillips' scientific staff: "We do get concerned about losing people if they see that funds are drying up."

—Arthur Klausner

CORPORATE STRATEGY

DAMON CONTEMPLATES ENCAPCEL LICENSING

NEEDHAM HEIGHTS, Mass.—Even with the protection afforded by a patent, Damon Biotech has no immediate plans to license its Encapcel™ technology. The patent, finally awarded in late January 1985, covers a cell culture technique developed in 1978 by Franklin Lim (Medical College of Virginia, Richmond). According to Dana Ono, manager of business development at Damon Biotech, the company will continue its present business strategy: to produce monoclonal antibodies for clients in-house. Ono says it is difficult to transfer the Encapcel technology. By maintaining control over the technology, Damon Biotech maintains control over the purity and quality of the monoclonal antibodies produced—and also over its own reputation.

Damon applies its microencapsulation technology to a client's cell line to produce antibodies to the client's specifications. This is always done first on a small scale: if the client is satisfied, then serious production begins. Damon Biotech now has 17 clients; the current backlog of orders for the large-scale production of monoclonals, over and above its long-term contract orders, is more than $1 million. Serono Diagnostics Ltd. (U.K.) awarded Damon Biotech a two-year contract to produce large quantities of 12 monoclonal antibodies for its immunodiagnostic test kits. Hoffmann–La Roche (Nutley, NJ) is using Encapcel-produced monoclonals to purify alpha-interferon. Eli Lilly and Co. (Indianapolis, IN) placed orders with Damon Biotech for test quantities of a number of different monoclonal antibodies. Damon is now producing large quantities for Lilly in its 9,000-square-foot cell-culture facility, built to comply with the FDA's Good Manufacturing Practices for human pharmaceuticals. Damon has thus increased its monoclonal antibody production capacity from several hundred grams per year to approximately 20 kilograms per year.

The long-term goal of the company is to become a major biopharmaceutical house. As Ono says, "You can't build a company like that just on contracts." As the company develops toward this end, it will probably grant a limited number of licenses for Encapcel. Ono says that these licenses would be granted only to companies that have a good posture in the marketplace and are producing something in line with Damon's own interests. This means that any future licensing will be done on a product-by-product basis. The company may consider training representatives from potential licensee firms, as well. At present, the only licensee is Hoffmann–La Roche: this permission was granted only after the two companies worked together to achieve a series of "successful milestones" in product development.

Using Encapcel technology, Damon Biotech has grown about 40 cell lines of all types. According to the company, the techniques of both encapsulating cells and then breaking open the capsules are so gentle that the same cells can be encapsulated repeatedly. When antibody is harvested from the capsules, it is already 40–70 percent pure and is readily purified to greater than 95 percent. The system yields up to 10 grams of antibody per liter of capsules—an order of magnitude better than yields achieved by conventional techniques, but equivalent to other membrane processes. Cells grow to high density in the capsules, but do not start producing antibody until they fill the capsule. Ono says it is not at all clear why the encapsulation procedure results in a 10-fold increase in product yield. It may have to do with the microenvironment created when cells are in such close contact.

The Encapcel system can also be used to trap biological materials other than cells. The system is being tested as a delivery mechanism to carry drugs or other materials into the body, allowing for controlled, timed release. The compound diffuses out of the capsule; when the capsule is empty, it dissolves. In fact, scientists at Vivotech (a recent joint venture between Damon Biotech and Connaught Laboratories) hope to show that encapsulated healthy pancreatic cells, when transplanted into a diabetic host, will create a self-adjusting insulin source. **—Jennifer Van Brunt**